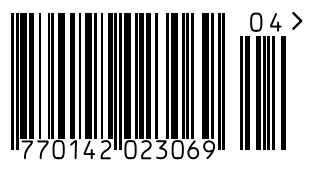


APRIL 1998

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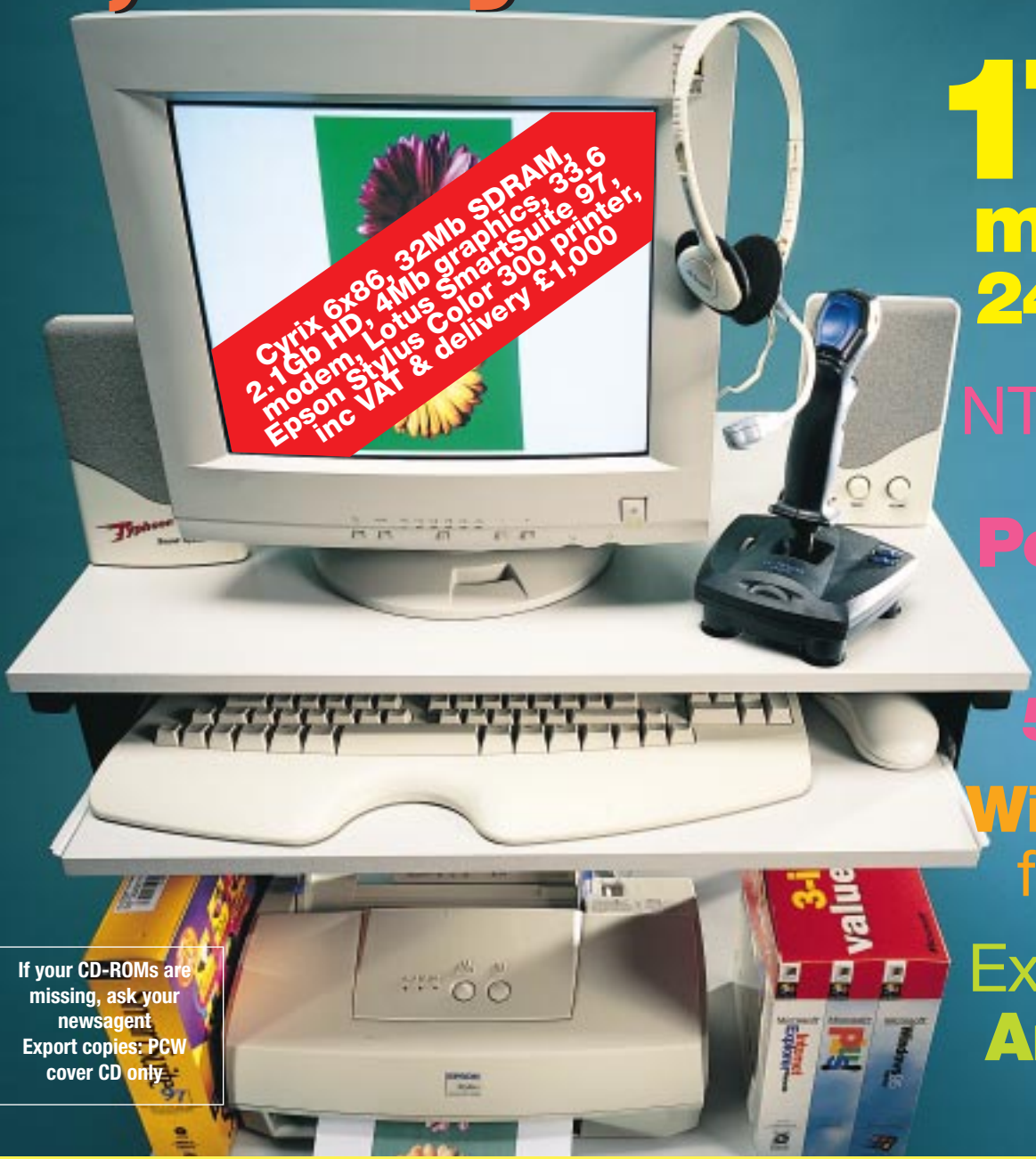


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SUPER SAVERS £1,000 systems - all in!



17 inch monitors
24 tested

NT challenge
Dual Pentium II vs Alpha 533MHz

Windows 98
first review

Exterminate! Anti Virus

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On the CD Try ClarisWorks Office and Fifa: Road to the World Cup

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VNU BUSINESS PUBLICATIONS

Editorial

The subject of this month's editorial is so obvious, it's staring me in the face. Monitors. Regardless of the make of your PC, how often you use it and what you use it for,



your monitor is the one part in constant operation. It's a crucial component too, being your PC's primary means of communication with yourself. You'd think that all this, coupled with the fact that a poor display could encourage eye strain and headaches, would ensure that everybody invested in a good model,

but this is rarely the case. In the ferociously competitive business of selling computer equipment, every penny counts. It's considerably more difficult to splash a big number indicating the performance of a monitor on an advert, than it is the power of a processor. As a sad consequence, this results in many packaged systems compromising on the quality of a display in order to keep the bottom line low.

The situation is sometimes worse still, when a decent monitor is supplied but set up incorrectly, resulting in a flickery image with poor contrast and often not even straight edges.

Fortunately, there is light at the end of the tunnel. Magazines such as *PCW* have long sung the praises of a correctly set-up quality monitor and rewarded those PC manufacturers with the foresight to supply a decent model with their systems. Perhaps you weren't one of the lucky ones or you fancy a change to something better — that's where the third parties come in, and their 17in monitors are without a doubt the bestselling model. That's why in this issue we've taken no less than 24 of them into the VNU Labs for the strictest testing. Do your eyes a favour and check out the group test on page 192.

It's annoying to discover you've forgotten to include the cost of extras when budgeting for a new system, so our PC group test this month consists of complete systems costing £1,000 including VAT and delivery.

■ *Personal Computer World* will be 20 years old in May and we have plenty to celebrate in our anniversary issue next month (see *panel, opposite*). To make sure you join us on the special day, use the coupon to reserve a copy of the May issue with your newsagent.

Gordon Laing
Managing Editor

Next Month

PCW 20th anniversary



Next month we're 20 years old and in our anniversary supplement we're taking a trip down memory lane. All the milestones from the last two decades of computing are there to reminisce about.

20 PCs for every budget

We're using our anniversary as the perfect excuse to test no less than 20 PC systems, ranging in price from £500 to £2,000.

PDA's

What's pocket-sized but packs the power of a PC? A Personal Digital Assistant, that's what. As our group test shows, they fax, email, browse the web, talk to your PC and even recognise your writing.



SECURE YOUR COPY OF THE NEXT ISSUE OF PERSONAL COMPUTER WORLD

Fill in the coupon below and hand it to your newsagent.

TO MY NEWSAGENT:

Please reserve for me a copy of the **MAY 1998** issue of *Personal Computer World*, on sale 26th March 1998.

Thereafter, please reserve for me each month a copy of *Personal Computer World* until I advise otherwise. I understand that I may cancel my order at any time.

Name

Address

Signature

Date

May '98 issue

■ On sale Thursday 26th March

* Next month's contents subject to change.

April Cover disc

All about the April 1998 *Personal Computer World* CD-ROM.

■ System requirements

You need a PC with Windows 3.1 or later and a colour VGA display. For best results run our CD-ROM on a Pentium PC with at least 16Mb of memory.

■ How to use the CD-ROM

1. Quit existing applications. If you have 16Mb or more of memory you don't have to do this but you will get better performance if not too many other applications are running.

2. Put the disc into your CD drive:

• Win95 — If you've got Windows 95, the PCW interactive loader will appear on your screen. If your CD doesn't autoloading, go to Start/Run and type

```
<CD Drive>:\pcw.exe
```

• Win 3.1 — From Windows Program Manager choose File/Run, then type

```
<CD Drive>:\pcw.exe
```

and press enter.

■ Uninstalling Software

Please note that VNU Business Publications takes no responsibility for damage caused to computers, or to the data contained on them as a result of following these instructions. This information is supplied by popular request to assist readers with the management of their machines. Before removing anything from your system, make sure you are confident about what you are doing and that your data is adequately backed up. Deleting anything from your system could result in errors.

Uninstall menu option

Contemporary software will often create an UNINSTALL option in its program or menu group at the time it is installed. By selecting UNINSTALL from the menu when you no longer want to use the application, a program will be run that will remove all the files, icons, and menu entries it added to your system during its installation. This is the best way to remove an unwanted

Important notice

The publisher, VNU, has checked the Personal Computer World CD-ROM for known viruses at all stages of production but cannot accept liability for damage caused either to your data or your computer system which may occur while using either the disc or any software contained on it. **If you do not agree with these conditions you should not use the disc.** It is good practice to run a virus checker on any new software before running it on your computer and to make regular backup copies of all your important data.

• *Unless otherwise stated, all software contained on the CD is for demonstration only. This means it may be restricted in some way: it may, for instance, be time limited or have certain functions disabled.*

application and should be your first choice.

Windows 95 file management

This method is the best alternative to running a supplied uninstall program but depends on Windows 95 having kept a record of the installation.

If you are using Windows 95, and no UNINSTALL menu item is created, you may be able to get Windows 95 to tidy up for you by following these instructions:

1. Click on the START button, select SETTINGS and then CONTROL PANEL.
2. In the CONTROL PANEL window, click on ADD/REMOVE PROGRAMS.
3. From the grey box, scroll through the list that is displayed until you find the application you want to remove and then click once to highlight.
4. Click on the ADD/REMOVE button in the bottom right corner of the grey box — the uninstall program will run.

Other removal options

Some software will only be installed into its own specially-created directory. If no STARTUP options or menu groups were created by the installation, simply deleting the directory will remove all files that were

added to your system. *NB This method should be used with care!*

Unexpected leftovers

If, having deleted a directory, you find that the program still shows in your START MENU, or you get messages looking for the application every time you restart your machine, you may have to remove the entries manually:

1. Click on the START button, select SETTINGS and then TASKBAR & STARTMENU.
2. On the grey box that appears, click the START MENU PROGRAMS tab.
3. Click the REMOVE button, to use this option.
4. From the displayed list, select the program you want to remove then click the REMOVE button at the bottom of the box. The entry will be deleted from your STARTMENU.

Programs which run every time you start your machine may be found in the specially-named sub-folder called STARTUP.

■ CD-ROM problems

Our technical helpline (0891 715929) is open weekdays, from 10.30am to 12.30pm and from 1.30pm to 4.30pm. Calls cost 50p per minute.

If you experience problems with the CD-ROM: perhaps a message such as "Cannot read from drive D:" please return the disc with a covering note bearing your name and address, and clearly marked "PCW CD April 98" to:

TIB plc, TIB House, 11 Edward Street, Bradford, BD4 7BH.

A replacement disc will be posted to you.

Getting your software on to our CD

Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc. Please telephone

Afshan Nasim on

0171 316 9761 or email

afshan_nasim@vnu.co.uk

Technical Helpline 0891 715929
Calls cost 50p per minute

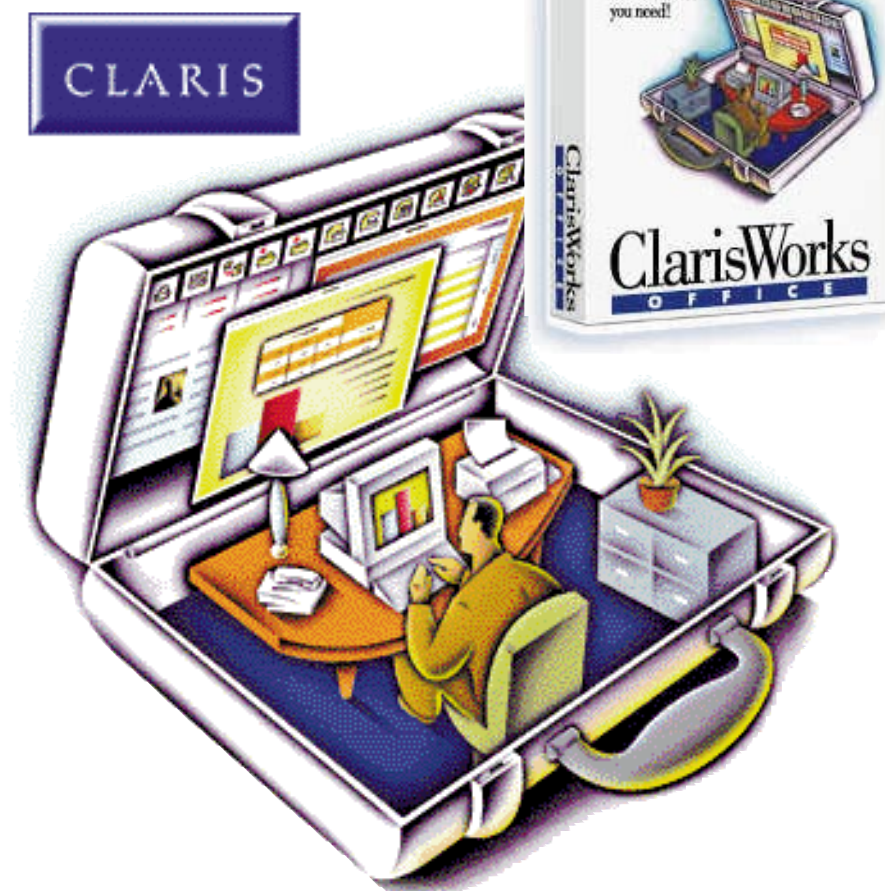
■ Hands On

The Hands On section of the CD brings you the entire contents of the last 12 months' of *Hands On* from the magazine, in a fully-searchable format using Adobe Acrobat. The files are sorted into chronological order under their section headings. These include in-depth facts, tutorials and workshops across diverse topics such as Visual Programming, Word Processing, 3D Graphics and Sound.

Please note that if your installed version of Acrobat is less than version 3.0, you may get error messages accessing these files. You can upgrade your version to Acrobat Reader 3.0 by installing it from the Utilities section of the Software Library.

■ Featured applications

ClarisWorks Office (Win95 only). A full-featured word processing, spreadsheet, database and basic desktop publishing package for small- and home-office professionals. There is something for everyone in this efficient package. An extensive list of features includes mailing label creation, newsletter design, presentation and worksheets covering marketing, finance and general management. There are built in web page design tools and access software, for direct access to the net from within the program. There is extensive compatibility with other



popular office programs, and moderate disk and memory requirements mean even modest computers will run it comfortably.

Microsoft Visual J++ Professional Edition. You can create, test, tune and deploy Java code on multiple platforms

GLpro Express — full version

This Express Edition of GLpro will give you a taste of the power and flexibility of GLpro: browse the online help file to see the huge range of commands and variables designed to make fast, powerful, flexible multimedia applications easier to develop.

The memory overhead and runtime size of GLpro is so small (about 250K) that it greatly outperforms every current multimedia authoring tool on any Windows platform and can be used to create applications that will fit on a floppy disk. It is also ideal for creating demos to distribute across the internet.

The commercial GLpro products come in four versions, and can be purchased at the following prices (ex VAT): Lite £60, ScreenSaver £99, Standard £349, and Advanced £599.

To view the features available in each version, there is a comparison table in the help file: click on the Commands button, then on any command and then on any one of the little icons named (adv, std, scr, lite, dos). This takes you to a GLpro Editions page.



GLpro is updated every 48 hours from customer feedback — check the online sites frequently to see new commands, features and performance improvements.

GLPro is published and distributed by G-Media, Ivy House, 8 High Street, Twyford, Berks, RG10 9AE.
Phone Eddie Coe on 0118 934 5656 (fax 0118 932 1203); or email sales@gmedia.net; URL www.gmedia.net

Technical Helpline 0891 715929 Calls cost 50p per minute

askSam 2.0 — full version

IMPORTANT: To run askSam, you will need the serial number: 200-82108-95012



Every day you are flooded with information: names, addresses, phone numbers, memos, notes, and reports. The clock keeps ticking as you waste time looking for information that should be at your fingertips.

askSam is a freeform database for all levels of Windows users. It is an amazingly simple way to organise all types of information and combines the most important features of a text retrieval system with those of a database manager, creating a powerful solution to your information management needs. It allows you to find any word or phrase in your database so there is no need for you to concern yourself with fields, indexes or field lengths. And, you can carry out powerful searches for full text, Boolean, Numeric, Hypertext, Wildcard, Proximity or date.

Internet applications

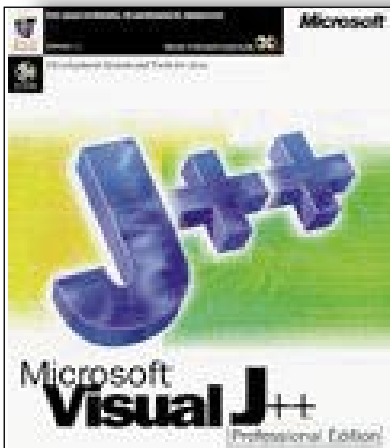
If you use askSam to manage internet information, these pre-defined applications will get you up and running quickly and efficiently. The applications include archive files for email and newsgroup messages, as well as files for importing and creating HTML files.

Other important new features include:

- Pick lists
- Fuzzy searching
- Import into entry form
- Inserting and editing graphics
- Compressing graphics

askSam normally retails at £99 but Guildsoft is offering an upgrade to the very latest Version 3 for £49.95 + £6.00 P&P (incl VAT) — an incredible saving of 50 percent!

For further information, or to place an order, ring Guildsoft FREE on 0800 289041 or email sales@guildsoft.co.uk



from within a visual environment. Developers are able to access databases and existing applications, create reusable Java components and use their Java programs in popular applications like Visual Basic, Delphi, and Excel as well as in web pages.

GL Pro Full Version. Please see our GL Pro box-out (left) for further details and purchase information.

Ask Sam Full Version: In order to run askSam, you will need the special serial

number supplied: please refer to our askSam box (above) for this, and further details and upgrade information.

Money Manager As a straightforward and easy-to-use accounting system, this is ideal for a wide range of applications: small businesses, professionals, consultants, schools, churches, clubs and home accounts.

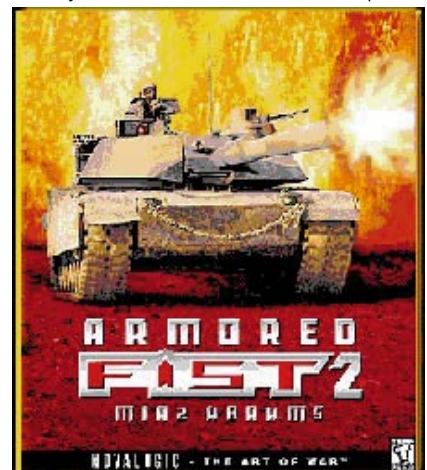
Money Manager comes both in Personal and Business editions and here we feature the former, designed for private individuals to keep track of their income and expenditure, bank accounts and credit cards.

Data from the Personal Edition can be used with the Business Edition, too, so if your needs change, you can upgrade from one to the other.



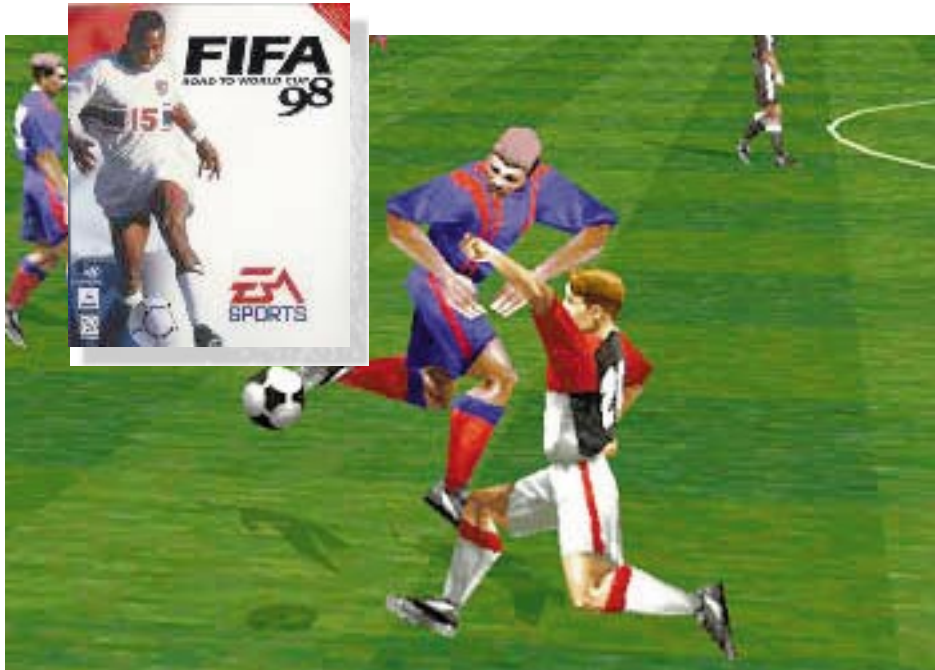
Featured games

Armoured Fist 2 (Windows 95 only). An action game with strategic elements for long-term appeal. Seize enemy bases, engage ground and air targets, call in artillery and air strikes, defend and capture



territories. Revolutionary Voxel Space-2 rendering technology creates fast, photo-realistic terrain and amazing atmospheric effects. Special features include a realistic combat environment and sound in Dolby SurroundSound. Multiple players can play via modem, LAN, or the internet.

Technical Helpline 0891 715929 Calls cost 50p per minute



◀ **Fifa: Road to the World Cup 98** (Windows 95 only). Football fever grows in 1998 as you defeat entire nations to qualify for the World Cup. Start in the initial qualifiers, playing to beat 172 teams from six international zones for a place in the final rounds.

Just some of the features of this realistic competition include "One Touch" passing, realistic motion-captured players, an extensive play-by-play commentary and detailed statistics for over 4,500 players. Also features modem and network play for up to 20 players.



▲ **G-Police** (Windows 95 only). Here's the plot: it's vengeance for the murder of your sister and *you* solve the mystery while serving as a pilot for the G Police — they who patrol the skies of the cities of Callisto eliminating urban street gangs amidst the cross-fire of warring corporations! This is a combat flight sim set inside the dome, which limits the terrains but makes up for it in flying skill. In the tradition of other Psygnosis titles the game boasts amazing light-sourcing and special effects.



▲ **NetStorm** (Windows 95 only). Command the skies as chief battle strategist in NetStorm, where floating islands wage war to gain the favour of the Furies of Wind, Rain and Thunder. Tap the power of the elements to set the sky ablaze with never-before-imagined war machinery, including Thunder Cannons, Acid Barricades, Crystal Crabs and Devil Makers.

■ **Featured multimedia**
AA's Days Out In Britain & Ireland.



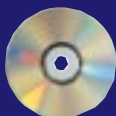
Plan a day-out quickly and simply with this guide to over 2,000 heritage and leisure attractions. You can print the UK mainland maps as well as attraction details, with clear road directions to take with you on your journey. An easy-to-use search facility will instantly identify the day-out closest to your requirements.

▶ **Virtual DJ** (Windows 95 only). Hothouse creates leading edge multimedia products for the entertainment industry and brings you

this recent music and video promotion for Suburban Base Records.



April 1998



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Norton Anti Virus	—	Virus checker
Opera Browser	—	Browser
Paintshop Pro 3.11	—	Graphics editor
Paintshop Pro 4.14	—	Graphics editor
PC order form	—	Kit ordering made easy
SANDRA	—	Win95 diagnostics
Soccer Scoresheet	—	Soccer results recorder
Tama-Gotcha	—	Virtual pet screensaver
Transasset	—	Asset Management
Visual BASIC library	—	Visula basic drivers
Voice Guide	—	Voice mail
Winshuffle	—	Shuffle puzzle
Winzip 6.3	—	File compression
Yendorian Tales	—	3D fantasy game

About our Software Library

We've got software to suit all tastes. Take a look at Accounts Pro, Billing Manager and TransAsset which provide a comprehensive suite of tools to take care of business. Also, check out the Desktop Lawyer Scratchcard which gives you the chance of winning a copy of Essential Letters or Business & Home legal document creators.

You'll find a fully-functioning trial version of FineReader OCR software which lets you extract text from most scanned documents. And, there's a freeware version of Audio Grabber which allows you to obtain perfect digital samples from your audio CDs.

Now that the football season is well-and-truly hotting up, you'll find Soccer Scoresheet a handy little application for helping keep track of the league tables. And, we're getting into the groove with Modified's Cruise demo which turns your desktop into a kickin' warehouse rave.

For the net, you'll find Browserola which lets you test your HTML pages, for a range of different browsers, from a single application. There's the Opera 3.0 internet browser which provides an alternative to the big-name browsers. As far as fun and games go, there's the addictive Tama-Gotcha Screensaver.

Hard day at work? Release your frustrations by stomping around strange and exotic lands with an M-16, blowing away the bad guys in the very blocky, but nonetheless cool, Assault Trooper. Or if you prefer your gaming with less guns and more swords, why not relieve your frustrations by stomping around a strange and exotic fantasy world with a large axe, hacking down the bad guys, in "Yendorian Tales 3: Tyrants of Thane".

And of course there's our regular batch of essential utilities — Phew! How *do* we cram it all in?

Contributor helplines

AA Days Out 01274 841347 (9am-5pm); support@bradreth.co.uk
Armoured Fist 0171 405 1777 (9am-6pm); mimovel@novalogic.co.uk
askSam 01752 895100 (9am-5.30pm); tech@quildsoft.co.uk
Claris Works 0345 413060 (10am-5pm); www.claris.co.uk
Desktop Lawyer 0990 084251 (1pm-5pm); support@kindware.com
Fifa: Road to World Cup ngrange@ea.com
GLpro 0118 932 1203; glpro@gmedia.net
GPolice 0151 282 3333 (9am-5.30pm)
Money Manager 0181 743 9792 (9am-5pm)
Netstorm 01895 456700 (9.30am-5.30pm)
Virtual DJ kboulton@compuserve.com

Web access

If you have an internet connection, you can access the *Personal Computer World* web site direct from the CD-ROM — just make sure your connection is open and then click on the yellow bar in the opening screen of the CD.

VNU | NET at
www.vnunet.com

Europe's largest IT and business publisher — online at vnu | net.

Our site contains minute-by-minute news updates, via our *NewsWire* service, and some of the best editorial features from VNU Publications' 15 printed tabloids and magazines.

And, new to vnu | net this month:

- E Commerce — the new internet magazine which contains all you need to know about buying and trading online
- The Forum — catch up with other *PCW* readers on this 24-hour open discussion group
- The 25th Anniversary Special edition of *Computing*
- Final Reality — the ultimate 3D benchmark. If you missed it in previous months on the CD, download it now from the web site.



www.jobworld.co.uk

Jobworld is the fastest, most convenient internet recruitment site, displaying contract and permanent vacancies as they happen.

It is free to United Kingdom and international job-seekers and carries thousands of contract and permanent vacancies in IT, accountancy and management consultancy.

Our service already satisfies 30,000 registered contractors, and posts up to 500 new jobs a day.

Using jobworld, you can find the right job today and apply online, there and then. Or you can register for our email alert service, which will forward you the jobs you want, direct to your mail box.



Technical Helpline 0891 715929 Calls cost 50p per minute

Get **online** and win over **£2,500** worth of prizes with **CompuServe**

CompuServe offers you more than a mere connection to the internet. Simply load the CD-ROM on the front cover of this month's *Personal Computer World* and discover the wealth of information and services available to you today. Join now, and get your first month's membership free plus ten hours of online time*.

More than 400,000 people in the UK are taking the fast lane to the internet with CompuServe. Membership gives you access to 19 different online Communities covering anything from the latest news, weather, and holiday deals, to share prices, online banking and business databases. CompuServe brings you its own exclusive content along with the best of the internet.

You are also entitled to an array of exclusive benefits including super discounts on big-name products, regular promotions and special members' offers. You will receive constant care and attention through regular updates, tips and recommendations both online and in members' publications posted to you.

CompuServe also offers you, whether you are a novice or an experienced user, comprehensive training courses based at our training suite in Bristol. The courses are designed to familiarise you with the service and benefits of CompuServe. You will also be trained on email, Forums and surfing the net.

We want you to experience the full potential of CompuServe and the internet, so enter our online competition and you could be one of ten lucky winners to participate in a one-day in-house training course worth £255.



How to enter

If you are not already online with CompuServe,



you need to join up in order to enter the competition. To do this, you can take advantage of the membership trial offered on the CompuServe CD.

To install the software and sign up, just follow the instructions on the rear of the wallet containing the CD. Once you have signed up, type PCWCOMP at the GO command to get our competition online.

You will be asked to supply the answers to the following three questions and to complete the tie breaker. (The answers can all be found in the interactive tour of CompuServe which you will also find on the cover CD.)

1. Which current personality does the online movie reviews?

a. Barry Norman b. Roger Ebert c. Terry Wogan

2. Which high-street bank offers online banking with CompuServe?

a. TSB b. Natwest c. Royal Bank of Scotland

3. Which airline is featured in the travel section of the interactive tour?

a. United Airlines b. British Airways c. Cathay Pacific

■ The tie breaker:

Complete the following sentence in 25 words or less:

I would like to attend a CompuServe training day because.....

.....

.....

.....

Competition rules

- All entries must be made online. To enter, type PCWCOMP at the GO command.
- Go PCWCOMP is a free service but normal telephone charges apply. You can access CompuServe via a local call on 0845 080 1000 from anywhere in the UK.
- If you stay online beyond your first month, subsequent months are charged at £6.50 per month with five hours free online time per month. If you stay online beyond your free usage time, you will be charged £1.95. Premium services (indicated by \$) carry a surcharge and free online time does not apply when using these.
- The competition is open to UK CompuServe members only. Employees of CompuServe worldwide and VNU Business Publications are expressly excluded.
- Entries are strictly limited to one per member.
- Winners will be selected from online entries with questions 1 to 3 answered correctly and who in the sole opinion of the judges submitted the most original tie breaker.
- The decision of the judge is final and no correspondence will be entered into.
- All winners will be notified by email or post.
- The closing date for entries is 30th April 1998. All winners will be notified by 31st May 1998.
- A full list of winners will be available after that date by writing to PCW/CompuServe Competition, CompuServe Info Services, Apex Plaza, Forbury Road, Reading RG1 1AX.
- Proof of submission of the entry is not deemed to be proof of receipt.
- No cash alternative will be offered.

* CompuServe is a global information service and all prices are set in US dollars. However, you will be charged in your local currency based on the prevailing exchange rate. Membership is \$9.95 per month. Premium Services (indicated by \$) are excluded from the free online trial. Prices exclude VAT where applicable.

Newsprint

1Gb disks for £24

■ Syquest's £144 SparQ drive has shipped with 1Gb cartridges at £72 for three. Page 29

'Super MMX' chips

■ Intel's next-generation Katmai chip will use 70 new MMX-style instructions to boost graphics. Page 31

Macro threat

■ Macro viruses top the hit list. Page 49

UK scoops nine Milia 98 awards

■ British developers won half the multimedia awards at Milia 98. The Palme D'Or had yet to be announced at press-time.

Product finder, Scoot, part owned by PCW publisher VNU, won both a special and online reference award. Simulation game winner F22 Air Dominance (Ocean/ Digital Image) also won a special award.

Other UK winners were: G-Police (Psygnosis, action game); Dungeon Keeper (Electronic Arts/Bullfrog, strategy game); Quake II (Activision/ID, online game); Amnesty International Refuge (Bates, online society); Orly's Draw a Story (Broderbund).

● *Special report, p28*

AutoCAD rivals

■ AutoCAD faces two new compatible rivals: Visio will ship a preview version of its £400 IntelliCAD clone in November; IMSI says its imminent TurboCad 5.0 Professional will include an Autodesk development suite.

IMSI 0181 581 2108;
Visio 01372 227900

Alpha poised to hit the Windows mainstream

Compaq's \$9.6bn takeover of Digital could herald the emergence of a new mainstream Windows processor.

Digital's 64-bit Alpha range has been going since 1992 but has so far been used only for niche applications running NT.

It is by no means the only reason Compaq bought Digital but the deal will increase Alpha's chance of breaking into the desktop market.

Microsoft announced a new partnership deal with Digital shortly after the takeover and appears to be putting its weight behind the chip.

It has promised to release Alpha and Intel versions of NT 5.0 simultaneously, later this year. NT 5.0 will also incorporate Digital's FX!32 software which allows Alpha to run 32-bit Intel applications.

Just as significant is the fact that developers are beginning to compile apps for Alpha and NT. Ominously for Apple, many of these are the kind of high-end graphics apps which have traditionally run on Macs.



Digital UK chief Chris Conway (centre) admitted at a post-merger briefing that lean-and-mean Compaq had a different culture from Digital with its huge complement of servicing staff. But he insisted: "We will be a good fit." Also pictured are Digital product manager Robin Shuff (left) and sales director James Stevenson, who said Digital's skilled workforce would be a major asset for Compaq.

Corel last month launched its Ventura 8 desktop publisher for Intel and Alpha systems. It has already shipped an Alpha-based CorelDraw 8, which is bundled with Digital's personal NT workstations.

Alpha chips, free of the Intel need for backward compatibility, are faster than the 32-bit x86 dynasty though not necessarily better on "bangs per buck" (see *Alpha, p112*).

Digital has just launched a new Alpha 21264 which is expected to clock 1GHz within two years. Intel's own

64-bit Merced processor will not be available until then, leaving the 64-bit field clear for Alpha.

Intel wins whatever happens because it has contracted to make Alphas under a \$700m deal with Digital. As part of the deal it also got StrongARM technology, based on a RISC core from Cambridge-based ARM, giving it an extra edge in the appliance market.

Clive Akass

- *New Intel chips, p31*
- *News Analysis, p40*

Defiant Microsoft ships browser-enabled Win98 beta

■ Microsoft took one step back and two steps forward in its battle over a court order banning it from bundling its Explorer browser with Windows 95.

It removed the browser icon from the Win95 desktop, avoiding a threatened \$1 million-a-day fine, and promptly shipped a

new beta Windows 98 with browser functions built into the operating system.

Microsoft argues that it is artificial to separate the browser from the operating system, as the internet is, logically, simply an extension of the hard disk. The new beta, described as

feature complete, seems stable although some bugs remain. It is due to ship this summer.

The launch hype has already started, with briefings on why companies should upgrade.

Win98 includes TV facilities that will not come into their own until digital TV takes off in

earnest. And with NT 5.0 being seen as the path to the future, Win98 is unlikely to have the huge impact of its predecessor. It plugs many of Win95's gaps, though, such as USB support, and includes many usability improvements. **Clive Akass**

● *First Impressions, p72*

News edited by Clive Akass; news@vnu.co.uk

Internet News edited by Adam Evans; adam_evans@vnu.co.uk

56K standard agreed as faster technologies loom into view

An international standard for 56K modems has finally been agreed — just as faster technologies seem to be getting a look-in at last.

The new standard will be called V.90, a figure chosen only because it was the next available from the ITU international standards body.

Most users with 56K modems should be able to download V.90 upgrades within the next few weeks, although some may need to swap a ROM chip.

V.90 is a compromise between two specs: 56Kflex, from a consortium including Rockwell, and x2 from 3Com-owned US Robotics.

Manufacturers will spend the next few weeks testing that their V.90 modems work with head-end equipment. But users may still be advised to wait before buying: US reports warned that

manufacturers may ship before testing is complete.

Ironically, BT is testing a cheap ISDN link called Home Highway which could prove more popular than modems.

And big players in the US have agreed a DSL standard (see p42) which will piggy-back a 1Mbit/sec data connection onto a standard phone link.

BT, too, is looking at this but is field-testing its home-grown ADSL technology.

Mike Valiant, marketing manager for 3Com UK, believes that people will still buy modems. "They are cheap (under £100) and they are ubiquitous. You can go anywhere and use a modem."

Clive Akass



Fast digicam

Cynics might attribute the high price and slow development of digital cameras to the fact that a lot of people are making a lot of money out of film.

But we would be the last to suggest that this had anything to do with the c.£10,000 price tag on this wonderful SLR, the fruit of a collaboration

between Kodak and Canon. The DCS 520 can take 12 images at 3.5 a second before writing to its 340Mb PC card. It also has a fast 1394 port.

Lord Gnome takes the Gates shilling

Microsoft Network is putting *Private Eye* online in one of the more incongruous tie-ups in media history.

Editor Ian Hislop, launching the MSN edition, admitted that a large sum had been paid but would not say how much.

He insisted that the new MSN slot would not take the edge off *Private Eye*'s satire "though we did mysteriously lose our Virgin advertising after making a comment about pricks in balloons".

And he would not balk at using an embarrassing picture of Bill Gates like those showing him with egg on his face. "They gave a new meaning to the word interface," he quipped.

The online edition is a piece of merchandising rather than a mirror of the magazine. Gates seems to be collecting big names to strengthen his online content. His *Slate* magazine has signed up prominent *Guardian* columnist, Alexander Chancellor.



"That makes £3 billion in libel suits we've processed since the Bill Gates connection made *Private Eye* worth suing"

Short stories



Mad cow disease has finally hit the computer screen with this monitor cover from Monimal Trading. Other Monimals include cows, lions or sheep and to keep animal passions high they come with a screensaver which displays a suitable face. Each costs £15 (inc VAT) and are available at high street stores.

Monimal Trading 0171 734 8939

Y2K help site

The government has opened a national hotline for people seeking advice on the millennium bug. It has also published a guidebook and seven help sheets.

www.open.gov.uk/bug2000.htm;
Hotline 0845 601 2000



WordPerfect gets speech recognition

Corel will bundle Dragon Dictate's Naturally Speaking continuous speech dictation package into a special edition of the WordPerfect Suite.

The speech engine will drive WordPerfect directly, with some spoken commands; the stand-alone version of Naturally Speaking uses a separate editor.

The speech-enabled suite will probably cost around £10 to £30 more than the standard one and will come with a mike.

Corel www.corel.com

Wired UK

The UK has the highest number of internet users in Europe, comprising six percent of the world's total, says the *Internet Industry Almanac*. It is third worldwide, behind Japan and the US, slightly ahead of Canada and Germany.

DVD we wait

DVD for the first time gives designers a large multimedia canvas, yet there was little evidence of it at Europe's prime showcase. Tim Nott reports from Milia 98.

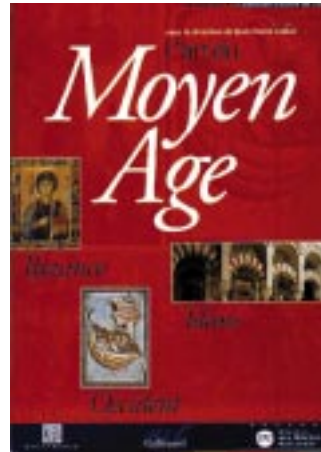
Cannes is famous first for its climate (T-shirts in February) and second for its film festival. There have been 50 of the latter, but the new kid on the block (now five years old) is Milia, the international festival of multimedia. This year the big story was going to be DVD. But those three little letters have brought fear, uncertainty and doubt in epic proportions.

Let's just do some brief homework. DVD video is what will replace videotape. The discs are the same size as a normal CD but can contain enough data for a feature film, together with enhancements such as multiple formats and multilingual subtitling.

Sounds good, but DVD has yet to be officially launched in Europe. Although drive prices have dropped to the \$300 mark, US sales were less than a third of the projected 1.2 million mark for 1997. Public in-fighting over standards between the participating companies did much to deter buyers old enough to remember the VHS-Betamax fiasco, and further confusion was added by Divx which uses the same storage technology but a different marketing approach. A Divx movie will only be playable for 48 hours, but will cost far less. If you want to play it again, then you'll need to pay a further fee via a modem link. It sounds complicated for the end-user but it's the paradigm that the video rental industry loves.

DVD-ROM, on the other hand, is just that: a development of CD-ROM that crams 4.7Gb of data onto a CD-sized disk. This is equivalent to nearly eight standard CD-ROMs and, with four-disc games becoming commonplace, should be welcomed by consumers and manufacturers alike.

DVD-ROM drives are already on sale in the UK and Europe, but what's muddying the waters here is the various options for writeable CD. Informed consumers are waiting for a one-stop device that will let them play games, view videos and back-up or archive data. Consequently, what's conspicuous by its absence at Milia 98, despite the proliferation of DVD stickers, is DVD titles. On the video front, so far you can buy the Luc Besson film, Leon, and the Canal+ show Les Guignols de l'Info (the French equivalent of our Spitting Image). You can also



L'Art du Moyen Age was among the nominations

get a video of Queen (the band) but only as a hardware bundle. There's more, but not much more, in the pipeline with *Wonderful Life*, *Microcosmos*, *Amor Impartial* and a Spanish version of *Rapa Nui*.

Mastertone is also releasing "public domain" classics like the original *Night of the Living Dead* and *A Star is Born*.

DVD-ROM is even scarcer. Comments ranged from "It's something we're looking at..." (BBC) to "Not yet" (Disney Interactive, Infogrames and practically everyone else). But there are a few titles: Havas will shortly release *Discoveries*, a timeline of the world from the big bang to the present day; and Ubi Soft has a new game, *La Famille Cosmic*, as well as a re-issue of *Guitar Hits*.

Other high points include "Internet for your mum". This set-top box from NetBox comes with a keyboard and remote control and for around 2,000 francs (£200) brings the web to the TV. It's completely plug-and-play, with a smart card to set up the connection to the no-choice 65 francs-per-month service provider, and offers all the internet goodies including built-in voicemail. Available in France, it will shortly be hitting the Finnish, German, Swedish and Spanish markets. But don't hold your breath: NetBox is still looking for an ISP partner in the UK.

Although exclusively a trade and press show (it costs more than £500 to get in) Milia is not just for the big boys. Some of the most original work is in the "new talent" pavilion. Out of 27 entrants, five are from the UK (all from Middlesex University) with projects including musical composition, a Primo Levi-based study of carbon, dance and Cornwall.

● At the time of writing, the award winners had yet to be announced, although the UK had nominations in every category and *Riven* was hotly tipped for the Palme d'Or. My personal award for dream technology went to the Pioneer stand, with a plasma display sporting a 16/9 aspect, a 50in diagonal and a thickness of less than 4ins. Already selling in Japan, this should reach the UK market later this year and will set you back around £14,000. Cheapskates will be able to buy a 40in version and get change from ten grand. ■

Riven: a hot tip from the UK in the Milia awards



titles. On the video front, so far you can buy the Luc Besson film, Leon, and the Canal+ show Les Guignols de l'Info (the French equivalent of our Spitting Image). You can also

SparQs fly as Syquest fights back



Syquest has finally launched its SparQ 1Gb removable drive, its biggest challenge yet to the omega drives which ousted the company as market leader.

The SparQ is available now for just £144 (ex VAT), including a 1Gb disk, for either an internal or external EIDE version. Even better, the disks cost just £72 (ex VAT) for three, the lowest cost per megabyte yet for random access disks.

The rival 1Gb Jaz drive

can be bought discounted for between £175 and £229 (ex VAT) and a single cartridge costs £59 (ex VAT).

Syquest UK manager, Steve Jamieson, believes the increasing size of hard disks will actually push up demand because people will want the backup capacity.

Stung perhaps by criticism that Syquest's 1.5Gb SyJet shipped nearly two years after it was announced, he stressed:

"[The SparQ] is a real

product. It will be in the shops by the end of February."

The performance of the EIDE and parallel versions is different but both are on a par with that of Jaz drives. The 12 millisecond access rate is similar to a hard disk's.

Syquest will launch a 4Gb Quest drive later this year and a 9.2Gb drive is planned before year 2000.

Clive Akass

Syquest 0131 339 2022;

www.syquest.com

Goodbye Claris, hello FileMaker Inc.

■ Three hundred Claris staff are looking for work after Apple announced it is dropping the subsidiary and reclaiming Mac OS 8 and the Claris Works office suite.

Claris will now focus almost entirely on its FileMaker Pro database, revamping itself as FileMaker Inc. James Silcock, FileMaker

marketing manager, said: "The number two retail database program in the world is becoming our future."

He did not know how Apple plans to rebrand Claris Works, but doubted if Claris' name change would cause confusion among customers.

US rumours have it that Apple offered FileMaker Pro to a number of companies, including Oracle and Microsoft, but could find no takers.

Dell notebooks top user poll

Dell portables and Gateway desktops give users the most satisfaction, according to an international survey of users.

Datapro's survey also found that customers who buy direct are more satisfied with their purchases than those who buy retail.

Toshiba and IBM were runners up for overall satisfaction among portable users, while Hewlett-Packard beat out Dell in terms of multimedia facilities, size and weight. Gateway just beat HP for desktop honours, with Dell a runner-up.

Gateway and Dell were found to have the best desktop pre-sales support, while Dell won post-sales support. Hewlett-Packard received the best ratings for reputation and product quality.

Short stories

QV-Link option

■ Beau Software is offering free trials of a \$34.95 replacement for the QV-link software bundled with Casio digital cameras. It says its QV-AutoCam produces much better pictures. Details at www.beausoft.com.

Low-cost Aptivas

■ Morgan Computer Company is offering cut-price 1997-spec IBM Aptivas and Compaq Presarios. Bargain hunters can pick up a 133MHz Aptiva 440 with a 1.2Gb hard disk for £500 and a 180MHz Presario 2212 with a 1.6Gb disk for £600 (ex VAT).

Morgan 0171 255 2115;

www.morgancomputers.co.uk

Printer discount

■ Kyocera is offering a £100 discount on its 12ppm, 600dpi Ecosys FS-1700 network printer, giving a starting price of £799.

Kyocera 0118 931 1500;

www.kyocera.co.uk



■ Hitachi's latest 21in monitors claim to offer a ten percent boost in fine focus for high-end DTP and CAD/CAM users. The 802ET-302 starts at £919 (ex VAT) while the 803ET-302 starts at £1,121.

Hitachi 0181 849 2092

Data laws 'could curb press intrusion'

■ Existing computer legislation could be used to combat unfair press intrusion, a data protection expert says.

Solicitor Simon Chalton, a member of the British Computer Society's Data Protection Committee, points out that the 1984 Data Protection Act requires that personal data be fairly obtained and processed.

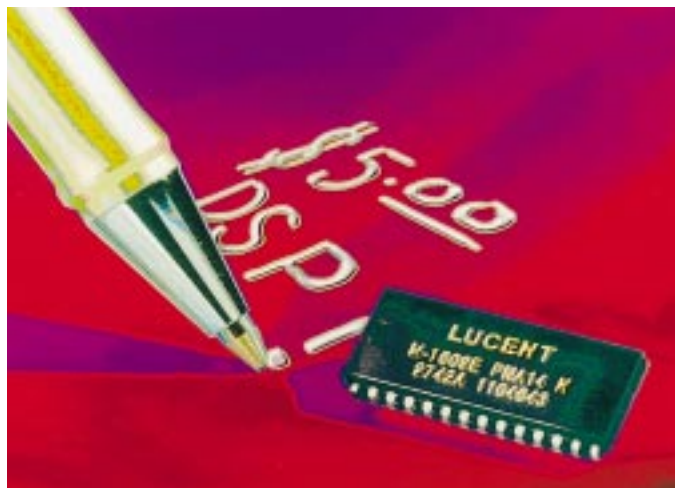
If a photo is taken against the subject's expressed wishes and then processed by a computer, the photographer would be in contravention of the act.

Intel processors to get new MMX-style boost

The graphics capabilities of Intel processors are to get a further boost next year along the lines of the multimedia extensions (MMX) to the classic Pentium range, the company has revealed. The next-generation PII, codenamed Katmai, due to ship in the first half of 1999, will have 70 new instructions to speed processing.

Intel will not reveal speeds but the first versions are sure to clock at least 400MHz, a speed mainstream chips are expected to reach this year.

Intel came under fire last year for launching MMX, which packed 57 new instructions, less than a month after the Christmas buying spree. Users complained that their new



The price of modems and net appliances could plummet thanks to a new digital-signal processing chip, the developer, Lucent, claims. The DSP 1609 costs \$5 in volume and operates at 100 million instructions per second. Lucent 01344 865910

Pentiums became outdated overnight. But European graphics product marketing manager, Graham Palmer, said this was not why Intel was releasing Katmai details.

He points out that, like MMX, Katmai will need software to be specially optimised to take advantage of it. "We want the applications to be ready at the same time the processor is launched," he said.

MMX involved some parallel processing of integers using what is called Single Instruction Multiple Data (SIMD) architecture for tasks, common in graphics, in which the same operation is done on many bits of data.

Katmai extends this to floating-point operations, which can involve fractions.

Clive Akass

Move to 64-bit next year

Also on course for next year is Intel's 64-bit processor, codenamed Merced, which is targeted at high-end servers and workstations. It will be made using 0.18 micron technology; much of the performance boost of current chips derives from a move from 0.35 micron to 0.25 micron.

Merced will run current 32-bit software native, as well as specially-compiled 64-bit code, but will take parallel processing even further than Katmai. It will come in several configurations tailored for specific applications.

Alpha challenge – see News Analysis, page 40

740 chip belies Grove boast

Intel has not restricted its attention to the main processor in offering graphics-boosting silicon, even though just two years ago chairman Andy Grove was boasting that Pentiums would be able to cope with all multimedia tasks unaided.

The Intel 740 chip is designed for the new AGP fast graphics bus and 440LX chipset with a PII processor. "Doom required 800

triangles per frame to be processed at maybe 12 frames a second," said Intel evangelist Robert McNair. "We're telling developers to expect 10 thousand triangles at a full-motion 30 frames per second."

The chip, which supports 2D and 3D applications, will be used in graphics add-on cards and will support up to 8Mb of dedicated RAM.

Short stories

Just the Jobs!

Steve Jobs revealed almost as an afterthought in his Macworld keynote that Apple made a modest \$47million profit in its first quarter, though sales fell 26 percent. Reports are that Apple's board has tried "begging and bribing" to convince Jobs to stay on.

Apple 0800 127753

Flash reader

Simple Technology is selling a £55 PhotoReader which reads compact flash memory cards that may carry document and audio files as well as pictures.

Simple Technology 01355 354608

Sun on Merced

Intel and Sun have announced a royalty-free cross-licensing agreement to co-operate on chips, systems and software. Their first project will be to optimise Sun's Solaris operating system for use on Merced (see box, left). Sun plans to deliver a 64-bit Solaris when Merced ships.

Sun Microsystems www.sun.com

Intel profits

Intel surprised analysts by announcing good year-end results. Its yearly turnover rose to over \$25 billion, with a fourth quarter gross profit margin of over 60 percent.

Intel www.intel.com



Small businesses can improve their net connectivity with the new Ramp Networks range. The WebRamp M3 (£311) combines an analogue router and four-port ethernet hub, giving access to both the internet and a LAN. The £513 M3t allows remote access, and the EntrE (£545) provides ISDN and voice ports. All three use Ramp's Connection Optimised Link Technology (COLT) which enables simultaneous users to share up to three modems.

Ramp 001 (408) 988 5353
www.rmapnet.com

Short stories

Insurance policy

■ Vision Gold, from Hewlett-Packard, Symantec and Vision Portable Computer Insurance, offers a 5Gb HP backup tape drive, Symantec's Your Eyes Only encryption software and 24-hour replacement insurance for £349 per year.

Corporate View 0990 848484;
www.vision-pc.co.uk

Graphics tie-up

■ Microsoft and Silicon Graphics will create a new Windows graphics API by combining their DirectX and Open GL technologies into a single programming interface to help developers create apps that run on both Windows and Unix.

Watt savings!

■ Powercom Direct is shipping 266MHz notebooks with Neo-Magic's MagicGraph 128XD multimedia accelerator, using two watts less than five-chip rivals. Prices from £2,299 (ex VAT).

Powercom Direct 01753 685613

Dumb bosses

■ UK executives use computers less than those overseas, says a report from Oracle and the Institute of Directors. Only 64 percent use one at work, as opposed to 84 percent in Germany and 100 percent in the US.

RSI help

■ Repetitive strain injury (RSI) may be avoided with Ergo Sentry, which alerts you to take breaks and offers health tips. It costs £37.50 (ex VAT) for up to five users.

QS Professionals 01525 382480

333MHz PCs hit the shops

The first round of PCs based on Intel's new 333MHz Pentium II have hit the market. Siemens Nixdorf announced two



business machines, the Scenic Pro D6 and the Scenic Pro M6, starting at £1,673 (ex VAT), and the Xpert 5720 home PC for £1,999 (inc VAT).

Gateway 2000

has two models for home and small office users: the G6-333 and the G333XL, which cost £2,149 and £1,799 (ex VAT) respectively. Both ship with DVD-ROM II drives.

Netpower UK has brought out two

Windows NT workstations, the dual-processor Symetra3 at £4,735 (ex VAT) and the single-processor Calisto3 at £2,705.

Viglen rushed to the front of the pack with four 333MHz PCs. The Genie and Contender ranges start at £1,099 (ex VAT), while an introductory offer makes the Business PC333 just £1,399. The top-of-the-range Viglen Awesome (pictured) is priced at £2,399 and features DVD-ROM as well as the LS-120 Super Disk, which supports 120Mb floppies.

Susan Pederson

Siemens Nixdorf 0800 125 5555;

www.sni-epc.co.uk. Viglen 0181 758 7000

www.viglen.co.uk; Gateway 2000: 0800 552 000,

www.gateway2000.co.uk; NeTpower UK

0118 988 0235; www.netpower.com

Sun shines with 'PC beaters'



■ Sun has launched an attack on the Wintel PC workstation with "aggressively priced" models at both ends of the power spectrum.

Ultra 5 and Ultra 10 workstations start at under £2,500, while the high-end Ultra 60 is less than £13,500. Steve Raby, workstation business manager, says: "Sun will prove that it can smash Wintel's cheap myth by meeting and beating PC workstation prices."

He says Sun's Elite 3D boxes, which start at under £10,000, give graphics users up to 52 percent higher performance than SGI's high-end Octane/MXI range, at less cost. And he claims applications vendors have pledged price parity between leading Solaris and Windows NT applications.

Susan Pederson

Sun 01252 399570; www.sun.co.uk

Browsing cheer for all mobile users

Caroline Swift continues her reports from Silicon Fen



The convergence of telecoms and the internet is nowhere more strongly illustrated than in Silicon Fen, from where technology is being licensed across the globe.

The mushrooming industry includes Symbionics, Analysys, Quotient, Ionica and The Technology Partnership (TTP).

TTP has made its presence felt in a number of fields. At February's GSM World Congress in Cannes, it demonstrated WebWalker technology which will enable a phone or palmtop to browse the web.

The technology, a joint venture with another East Anglian firm, STNC, will let phones or palmtops browse the web.

This involves stripping information from

sites designed for high-definition screens and formatting it for small mobiles. GSM wireless links provide functions similar to those of the Nokia 9000 Communicator but packaged smaller.

The technology is expected to feature in products selling later this year. Target manufacturers include Panasonic, NEC, Nokia, Ericsson, Philips, Siemens and Mitsubishi.

Tony Milbourn, who heads the TTP division, believes it will be a clear winner. He says users will be able to download different modules, such as a diary or even a new "look and feel". WebWalker enables share-price monitoring with SMS alerts to the handset, and access to a

Short stories

Layoffs mark shift in 'boom and bust' CD-ROM market

Publisher Dorling Kindersley (DK) has cut by half its multimedia workforce in a bid to return its ailing CD division to profit. Eighty jobs were lost and work on reference titles was contracted to outside developers.

The move is expected to cut direct costs in half, without affecting output. Sales are expected to leap in the next year, but CDs are expensive to produce. DK typically spends between £50,000 and £1 million on each title, while prices have plummeted to as little as £15.

Tim Pilcher, DK multimedia press officer, says: "We've seen big changes in the industry in the last year. People are starting to look at where their strengths and weaknesses lie."

CD-ROMs were viewed as a cash cow during their infancy. The DK situation has been cited as evidence that the CD medium

is in trouble. But Richard Teversham, marketing manager for Microsoft Encarta, believes good products like DK's will survive. But he predicts a shakeout in which the losers will be companies that "bomb the market with low-quality goods". Teversham said: "Cheap software is cutting its own throat. They should try to get their market share up on good products."

Sales of some reference CDs are booming. *Encyclopedia Britannica's* CD edition is selling so well that the company has laid off the direct sales force for its printed edition.

Teversham sees this as exciting competition for Encarta. "We've been there from the beginning and have feedback. They may find it difficult to find a firm footing."

Susan Pederson



■ Premier Electronics is selling a PC card-based video-conferencing kit with a digital colour camera and cable for £221 (ex VAT). Premier 01992 634652

Free Do\$h

A small UK company has struck a deal with Lloyds to supply small-business customers with free PC accounting software. DO\$H Cashbook, created by an ex-accountant, is fiendishly simple, letting you update accounts in less than ten minutes a day. Non-Lloyds customers can pick up DO\$H for £75 (ex VAT). Do\$H 0800 0264666; www.dosh.co.uk

Modem card

■ The digiTEL 34GTA 33.6Kbps card modem is approved for 27 different countries. It costs £159, plus £139 for ISDN and up to £145 for GSM. digicorp 0171 917 2849; www.digicorp.co.uk

Apricot plans mini notebook

Mitsubishi is pushing into the UK market with internet-ready notebooks. The Apricot AL700 ships with 48Mb RAM, a 3.2Gb disk, 20X CD, a 56K modem and a year's net access for £2,799 (ex VAT). The company also plans to bring out the Amity, an A5 Win95 mini notebook. But the product guaranteed to bring out the green-eyed monsters must be the ultra-slim 266MHz Pediton which has a 13.3in SVGA TFT



screen, 64Mb RAM and a 1Gb hard disk. Its optional "media pack" docking station features a 20X internal CD-ROM drive, 3.5in floppy and all necessary ports. But when freed from this, the Pediton is an amazing 18mm thick and just 1.45kg in weight. The Peditons will launch before summer, prices TBA.

Mitsubishi (Apricot) 0121 717 7171; 0800 212422; www.mitsubishi-computers.com

Lotus Notes database server.

It results from the synergy between the TTP's GSM expertise and STNC's mobile net technology which the company claims is the only one available that can be used in SmartPhone handsets without significantly increasing hardware costs.

"WebWalker provides the mechanism for getting the service on your phone that you now have on a PC," Milbourn says.

TTP designs GSM software and printed circuit boards for leading manufacturers Analogue Devices and Hitachi.

"If someone wants to get into this fantastic digital cellular market, no-one else is offering a complete end-to-end

technology," claims Milbourn. "We are a complete handset house with critical performance advantages. Our strong core functionality allows our customers to move quickly to market."

In terms of power performance, particularly when phones are on standby, Milbourn believes TTP's technology is leading the world.

"This is a very critical 'buy' parameter for customers," he says. "This is partly because we, who design software, also contribute to the chips."

By this he means that co-processors, which relieve the main digital signal processor of GSM-specific low-level bit manipulation, are designed at TTP.

Milbourn expects cellphone operators to continue subsidising handsets, with an increasing range of lower-priced, flexible tariffs becoming available.

Growth of the GSM phones market is on a straight upward curve: they are outselling PCs worldwide.

By the year 2000 it is anticipated that there will be more than 200 million of them in the marketplace, with co-operations by companies such as TTP and STNC promoting innovation into the way we live. Products which are now hardly within our reach, will become as commonplace as a pocket calculator.

TTP www.ttpgroup.co.uk
STNC www.stnc.co.uk

Place your alpha-bets

Could Alpha be a one-way ticket to success on a grand scale for Digital? Clive Akass looks at why companies are suddenly courting the chip maker.

Digital has long been a shrinking violet. The well-brushed, thrusting image presented by other IT companies somehow eluded it. Its employees, in the UK at least, tend to the crumpled jacket rather than the sharp suit. Yet despite a succession of loss-making years, Digital has consistently been at the leading edge, technologically speaking. And, like a young man with his first girlfriend, it has suddenly begun to look smart. As a matter of fact, it has had three suitors.

Intel announced that, subject to expected federal approval, it will buy Digital's chip fabs as part of a \$700m deal ending a patents dispute. Then Compaq agreed, with the same proviso, to buy Digital for \$9.6bn in the biggest IT deal in history. Two days later, less prominently but almost as importantly, Digital and Microsoft held a public love-in to announce a closer technological partnership. The Compaq deal will make the combine the world's second biggest hardware company in terms of revenues: \$37.7bn (still barely half of IBM's). There is overlap between the two, notably in notebooks, but Digital gives Compaq three assets:

- 1. Corporate contacts and expertise.** Digital is used to fulfilling huge contracts and is a world leader in clustering technology which allows a group of machines to act like a single powerful mainframe. Compaq bought Tandem (which specialises in robust banking systems) last year to complement its own developing business range. But CEO Eckhart Pfeiffer told a London press conference: "There was a space between the two in which we wanted to participate but could not."
- 2. Service and support network.** Digital famously has more Microsoft-qualified engineers than Microsoft, and

they are spread throughout the world. Maintenance and support is now seen as a big money spinner and more reliable than hardware sales which produce much the same revenues. This is good news for Digital people because it means relatively few jobs are likely to be lost.

3. The 64-bit Alpha processor. After years of having been a niche product, Alpha could finally have its day with the launch of NT 5.0. This is where the Microsoft deal comes in: the software giant has agreed to launch NT 5.0 simultaneously for the Alpha and Intel platforms.

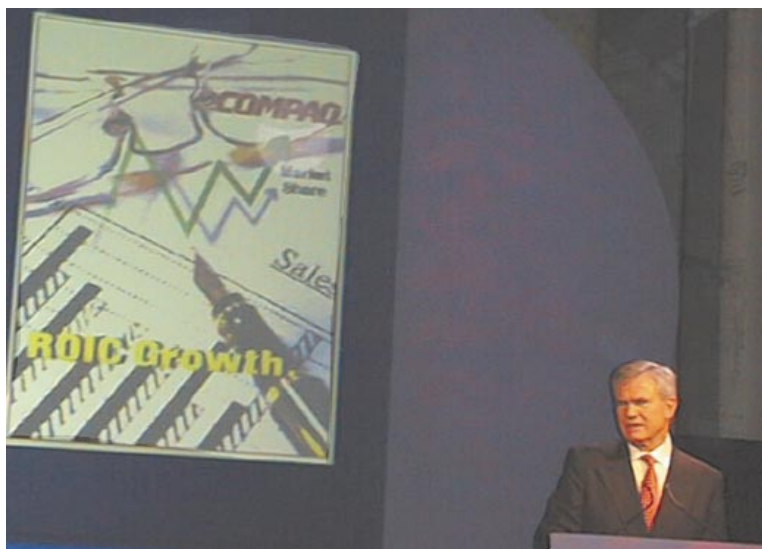
NT 5.0 is predominantly 32-bit but the Alpha version, and only the Alpha version, uses 64-bit addressing. This will give the Alpha an edge until Intel launches its 64-bit Merced chip next year when Microsoft will ship a full 64-bit version of NT. Version 5.0 will also pack Digital's FX!32 emulation software which allows Alpha to run standard 32-bit Intel-based apps. Bearing in mind that NT, rather than Win95/98, constitutes Microsoft's road to the future, and that the Alpha will run at least twice as fast as Merced (if Digital is to be believed), it seems that the processor could hit mainstream in a big way.

Here is a curious situation. Intel contracted to make Alphas when it bought the Digital fabs. Alphas are currently made by 0.35 micron processes which limit the speed at which they can run; even so, chip for chip they blow away Intel equivalents. Intel will eventually make the new Alpha 21264 on a 0.18 micron process, which will help Digital push speeds to 1GHz by 2000AD. So Intel expertise will improve one of its biggest rival products.

Intel will not be the only company making Alphas (licensee Samsung has already produced a 700MHz version); but could there not be a conflict of interest? Harry Copperman, senior vp of Digital products division, thinks not. "All we have done is to move to a non-fab business model. Companies like Cyrix don't make their own processors. And we have alternative sources if problems do arise." But it took a Microsoft man, countering accusations that NT cannot cope with very large systems, to spell out the excitement of Digital's future. Simon Brown, enterprise customer unit director, said Microsoft is stoking up NT to run up to 64 Alphas in parallel. Currently, he said, even the largest database systems are expected to cope with, at most, 2,500 simultaneous inquiries. "We are thinking way beyond that. We have to think of the internet in ten or more years' time when servers may have to cope with millions and millions of simultaneous calls."

● See our Alpha vs Pentium shoot-out on p112

Compaq CEO Eckhart Pfeiffer in London: His company's deal with Digital will create a revenue-monster and help it exploit a long-coveted gap in the market



On the war path

The use of Windows CE in many domestic devices could secure Bill Gates' success in yet another market. Tim Bajarin wonders at the next battlefield.

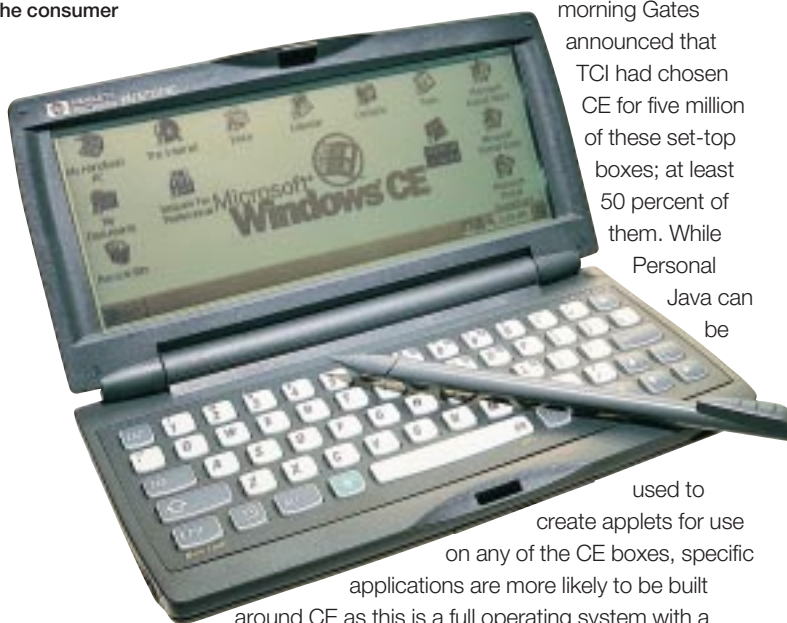
A new wave of CE-based domestic appliances like set-top boxes, digital televisions and palm PCs will open up a whole new world for the consumer

Two important software platforms for digital appliances emerged at the recent Consumer Electronics Show. Most prominent was Windows CE, which will be used in the new Palm PC and Auto PC devices announced by Bill Gates.

The previous day, Sun chairman Scott McNealy used his keynote address to introduce Personal Java, which is pitted directly against CE even though it is not an operating system. It forms a development layer for appliance software. McNealy said TCI, the largest cable company in the US, had chosen to use Personal Java for all its Advanced Digital Set-Top boxes (ADSTB).

It seemed, at the time, that McNealy had finally outsmarted Gates in landing this deal. But the next

morning Gates announced that TCI had chosen CE for five million of these set-top boxes; at least 50 percent of them. While Personal Java can be



used to create applets for use on any of the CE boxes, specific applications are more likely to be built around CE as this is a full operating system with a programming interface which developers can support.

This will become an issue for developers. Personal Java offers a development layer for applets which can be used with various operating systems and device interfaces. A user could have the choice between devices running CE, OS-9, GEOS or Sun's own consumer OS and interface.

But the great confusion caused to the customer by these choices means that Gates ends up with an edge in three key areas. Firstly, since CE looks and acts pretty much like Windows 95, any Windows user will be able to use a CE appliance right away. Secondly, CE gives users the same interface on all their appliances, which can all talk to each other and to Windows 95/98 machines. Thirdly, most early adopters will already be Windows users, providing a powerful word-of-mouth marketing force for the CE camp. They should, almost immediately, help make CE the leading OS for consumer appliances. TCI's five million CE-equipped set-top boxes will be quite an incentive for software developers to create CE applications in the thousands — and that's not taking into account devices like the HPC, Palm PC and Auto PC.

We will see thousands of Personal Java applets emerge but developers will like the stability of the graphical and programming interfaces of Windows CE. At the very least, Gates and Microsoft will get the lion's share of the digital appliance market from the start. Unless the Personal Java camp settles on one OS and graphical interface to limit customer confusion, CE could very quickly become the dominant platform.

Why is this battle between Sun and Microsoft so important? Today, more than 100 million PCs are sold each year, worldwide. The desktop market will continue to grow, spreading into Third World acceptance with low-cost PCs, but annual sales will probably never top 300 million units. However, sales of appliances like set-top boxes, smart phones, wireless devices, automobiles, palm PCs and digital televisions are expected to top a billion by 2001.

Sales of CE could dwarf those of Windows 95 within three years. Personal Java will also become a key software layer — something that will help the market for digital appliances to develop quickly. McNealy and Gates are both pulling out all the stops to get their platforms favoured by the developers as well as the market.

Make no mistake about it, this is the next major battlefield. And while both can be players, only one of them will come out on top. My bet is that a stable OS, GUI and API will help Bill Gates and Microsoft dominate this new market. ■

Digital devices

Early this week Microsoft, Compaq and Intel threw their weight behind a specific DSL (digital subscriber line) standard, with five of the Baby Bells (US telecom companies). Standards committees have been considering the technology for almost ten years but it took the threat of cable modems to get the comms industry to quit squabbling and back a standard.

There are still competing standards from Lucent and Bell Atlantic, but this proposed DSL standard now has the backing of major players in the PC and comms industries and could finally get DSL into US homes.

DSL allows standard telephone lines to carry digital data at speeds of up to ten megabits, although early versions will offer 1.5 megabits. Cable modems offer even higher bandwidth but require cable vendors to replace their hubs with a two-way service, which would be slow and costly. DSL could be available in the US by early 1999.

Of course, this only intensifies the battle with the cable companies. So if all goes well, US homes could have some serious choices for high-speed access by the year 2000.

Word spreads on macro virus plague

Macro viruses now account for half of the ten most common varieties, claims anti-virus specialist Dr Solomon. The figures understate the threat, which *Newsprint* was among the first to expose, as "standard" viruses like Form have been spreading for a decade or more.

Macro viruses have been going for only two years. They exploit the powerful macro

language in Word and Excel which allows apparently passive documents to do virtually anything you can do at a keyboard.

They spread, says Dr Solomon consultant Graham Cluley, because documents are swapped more readily than programs, the habitat of the traditional virus. The first macro virus, called Concept, was spread on a Microsoft technical CD and seems to

have originated inside the company. It was benign and seems to have been written to demonstrate the danger, hence the

name. In effect it was a virus template that could be adapted to be more dangerous.

Other Word and Excel varieties simply swap one or two words or figures in a file, with potentially devastating results. But the major damage so far has been the cost of clearing them up. "One company I know reckons it costs £50,000 to get rid of each infection. Some companies have hundreds of machines," said Cluley. "Even when a macro virus does not do much, companies have to get rid of it because it infects customer documents, which can be

embarrassing." Cluley thinks the problem will worsen as email documents become more active. Only attached documents can carry viruses. Is there a case for standardising on virus-free text-only email? "People are going to want the power of active documents. When there's a choice between power and security, power will always win."

But Wim de Koning, head of messaging specialist Fenestrae (*below*) said he believed some form of virus-proof passive format will continue to be used.

Clive Akass



New Outlook relies on trust

The new version of Outlook includes facilities for accessing calendars and business cards over the net. The US version is available from www.microsoft.com but it crashed on my UK software, so you may be advised to wait for the British version. The full program ships this summer.

David Bennie, Microsoft's UK desktop applications marketing manager, admits that Outlook 97 was slow and cumbersome. "We have speeded it up a lot," he said. Outlook 98 supports vCard, a protocol which allows linked computers to swap contact information. Bennie sees people using IR-equipped palmtops to do this instead of handing out cards.

Security measures are much like those in Outlook Express: one derives from Explorer 4.0, which allows you to bar ActiveX controls, scripts and Java applets; a second is provision for a digital ID, which proves you are the sender of a letter and allows you to receive encrypted messages. But it does not prevent a trusted correspondent from infecting you inadvertently in digitally signed, encrypted mail.

Clive Akass

The danger within

The Cap macro is by far the most common, accounting for nearly one in four attacks: five times as many as AntiEXE, the most common non-macro virus, according to the *Virus Bulletin*.

One reason for Cap's "success" may be that it saves all files as DOC files, Word's native format. This means it will survive even if you try to save in rich text format (RTF), the generic file format which does not support macros.

The RTF extension may fool elementary virus checks, but the file will load as active word documents. Cap is otherwise relatively benign.

1	Cap	Word macro
2	Empire monkey.d	Boot sector
3	Npad	Word macro
4	AntiEXE	Boot sector
5	Dodgy	Boot sector
6	Parity.b	Boot sector
7	Concept	Word macro
8	Temple	Word macro
9	Form	Boot sector
10	Laroux	Excel macro

Ministerial secrets

The government is taking no chances with its new high-tech ministerial boxes. Security measures include a signet ring to open the box and fingerprint recognition to boot the notebook, which also packs voice recognition.



Short stories

Domino effect on new IBM servers

IBM is replacing three of its server products — the 310, 315 and 325 — with the Netfinity 3500 range.

The Netfinity server family, aimed at small and medium-sized businesses, has two-way symmetrical multi-processing (SMP) architecture which leaves room to grow and comes with Lotus Domino

Server 4.6 as well as the IBM Systems Management Suite. Starting at £1,500, the Netfinity series will ship this quarter.



Fenestrae sends by least-cost route

Fenestrae is offering what it claims is the first server for Microsoft Exchange to send messages and faxes automatically by the cheapest route.

Faxination 4.0, despite its name, deals with all types of messages. In fact, Fenestrae has designed it as an integrated message service for large businesses. It uses a rule-based system to decide when to send a message and how, based on carrier charge rates.

Fenestrae 00 31 70 15 100;
www.fenestrae.com

p50 >

School shorts

35 schools in 'learn by satellite' scheme

■ A scheme for broadcasting multimedia educational material by satellite is being piloted in 35 schools. Espresso for Schools gives access to news, features and curricular material including video, animations sound and simulations. The project is supported by the British National Space Centre.

Espresso 0181 237 1200;
www.espresso.co.uk

Fujitsu offers £600 classroom PC

■ Fujitsu, which is giving a six-figure sum to UK NetYear (see story, right) is offering 200MHz multimedia PCs to schools for from £599 (ex VAT). It is also funding a one-year project involving 15 Net PCs and a Fujitsu server at a Bristol school.

Fujitsu 01344 475555;
www.fujitsu-computers.com

Free offer

■ NTL Internet is offering a free unlimited dialup net link to UK schools for two years. Schools are provided with filtering software, five email addresses and 5Mb of web space. NTL is also giving teachers half-price home access.

NTL 0800 406406; www.ntl.co.uk

BT award

■ BT HomeCampus won the BETT Educational Technology awards for the best home education product for children aged 4-16. For a free month's trial, call 0345 678578 or visit www.campus.bt.com/HomeCampus

Software aid

■ Viglen has launched ClassLink, a software suite that simplifies school network administration, automates software installation and lets teachers monitor classes.

Viglen 0181 758 7165;
www.viglen.co.uk

Susan Pederson reports from BETT 98

New plan to get 32,000 schools plugged into IT



NetYear's David Wimpress with boxer Chris Eubank

An ambitious public-private partnership to help schools implement and use information and communications technology (ICT) was launched at the BETT 98 education show.

UK NetYear aims to bring government, business, education authorities and local communities together to provide connections, training and resources.

One of its main goals is to see all schools using the

internet for teaching and learning by 2002AD.

Executive chairman David Wimpress pointed out that only 6,000 schools out of 32,000 are online, and most of those have only one school computers

are outdated and eight in ten teachers need ICT training, he said.

Twenty-three UK schools were linked up for the launch through videoconferencing and the

UK NetYear web site at www.uknetyear.org where details of the scheme are available.

UK NetYear will also help speed implementation of the National Grid for Learning, described by Education and Employment Minister Kim Howells as a "mosaic of interconnecting networks that will connect schools to libraries, museums, galleries and other schools".

Sponsorship and content agreements with Fujitsu, UUNET UK, Excite and BBC Education have been announced.



BBC lessons go online

■ Teachers and pupils alike can shake off those GCSE blues by checking out the BBC Learning Station, a new online service from BBC Education.

It brings together more than a thousand of the web's best educational sites in addition to the BBC's own curriculum-

linked resources. Teachers can shoot the breeze on the Educator's Forum while panicked students can line up at the Ask a Teacher service and receive email replies.

www.bbc.co.uk/education

Teachers get £5 million-worth of notebooks

■ A pilot scheme to give schools notebook computers is to receive £5m. Education and Employment Secretary, David Blunkett, said that schools nominated by local education authorities will get the technology to help them

develop skills and prepare materials for the National Grid for Learning. Schools should start receiving equipment by the end of the summer term.

Of those teachers involved in the first stage of the project, 98 percent made successful use of

the equipment they had been given, according to the National Council for Educational Technology (NCET). Next year, NCET will become the British Educational Communications and Technology Agency.

NCET 0171 925 5555; www.ncet.org.uk



Head start for gamers

"Use your head" is the watchword for users of this helmet, which lets you navigate game screens on the nod. It costs £80 with mike — less than many plain headsets. Another version, for voice-operated office PCs, is planned.

Union Reality
01308 424662

Lotus packs all its eggs into Notes 5.0 basket

New details of the forthcoming Notes 5.0, Domino, and Domino Designer have been revealed at the Lotusphere conference. All three products are expected to go into beta soon and will ship later this year.

The Notes 5.0 client, "Maui", will be given free to cc:Mail users who will also gain access to Domino servers. It will sport a redesigned web-

by Dominique Deckmyn
in Silicon Valley

like interface combining the features of cc:Mail, Lotus Mail, Weblicator and Organizer. It will offer its own browser but can be used with others.

The Domino 5.0 server will support more net protocols: HTML 4.0, XML, LDAP 3, S/Mime, IMAP4, POP3 and JavaScript. The Designer 5.0 development environ-

ment will offer web-site builders a structured view of the forms, pages and scripts that make up their application. It includes a WYSIWYG web-page designer.

Frameset Designer will simplify the creation of multi-pane interfaces.

Domino design elements have been rewritten into Java applets so they can be accessed from other environments.

Lotus 01784 455445

Don't panic! New Adams CD due

Hasbro is shooting for the top with its new Monopoly World Cup game, which launches next month in time for the real thing in France. The £40 limited-edition CD combines the thrills of the board game with the flavour of football. Traditional Monopoly assets are out: railway

tokens make way for animated footballers.

Mission Pack: The Reckoning, is a new Quake II add-on from Xatrix, available shortly and

offering 15 new scenarios. It is full of mutant aliens and boasts an arsenal of weaponry.

Also out soon is Starship Titanic, an interactive adventure from Hitchhiker's Guide author

Douglas Adams. And for fans of Men

in Black, the game of the film is out.

Next month, PCW Screenplay reviews Starship Titanic, Monty Python — The Meaning of Life, and the TOCA Touring Car Championship.



State of Play

Games news by Etelka Clark

Top ten games		Publishers
1	Grand Theft Auto	BMG
2	FIFA: Road to World Cup 98	EA
3	Championship Mgr 2 97/98	Eidos
4	Tomb Raider II	Eidos
5	Quake II	GT Interactive
6	Virtual Springfield	EA
7	TOCA Touring Car Champ.	Codemasters
8	Worms 2	Microprose
9	Age of Empires	Microsoft
10	Blade Runner	Virgin

Top 10 Windows software

		Last month
1	MS Win95 U/G + IE4	Microsoft 7
2	MS Frontpage 98 FP CD	Microsoft -
3	MS Office 97+ Books U/G	Microsoft 8
4	MS Encarta Deluxe 98 CD	Microsoft 1
5	Nuts & Bolts (3.1+95)	XAtlantic 5
6	MS Office 97 Stand V/Comp	Microsoft 13
7	MS Frontpage 98 CCP U/G	Microsoft -
8	Print Screen	POW! 11
9	PaintShop Pro v4.14 95 CD	Digwork -
10	Cleansweep Deluxe	Quarterdeck -

Top 10 DOS software

1	MS-DOS 6.22 MLP 1	Microsoft -
2	DOS 2 Win 95 U/G with Internet	Microsoft 3
3	System Commander v3.0	POW! 2
4	MS DOS v6.22 U/G	Microsoft 5
5	Corel WP 6.2 U/G	Corel 6
6	Turbo Pascal v7.0	Borland 4
7	Quick Address Lite DOS	QAS -
8	FSFX	U/G for MS Flight 7
9	Turbo C++ v3.0	Borland 12
10	Corel WordPerfect 6.2 FP	Corel -

Top 10 CD-ROMs

		Last month
1	Babylon 5: Ultimate Reference Guide	Cedent Software -
2	Encyclopedia Britannica	Acclaim 8
3	Print Master Gold Publishing 4.0	Mindscape -
4	Music File 98	File Productions 1
5	Oasis Interactive	Europress 2
6	Encarta 98 Deluxe	Microsoft 3
7	Star Trek Encyclopedia	Ablac -
8	Mavis Beacon Teaches Typing	Mindscape -
9	3D Garden Designer 3	Europress -
10	Encarta 98 Standard	Microsoft 10

Top 10 Peripherals

1	UMAX Astra 610p	UMAX 1
2	USR Sportster Flash EX	USR 3
3	AWE64 Discovery 24x kit	Creative -
4	UMAX Astra 610s	UMAX -
5	AWE64 Value ISA	Creative 7
6	MS Sidewinder Gamepad	Microsoft 4
7	WACOM PenPartner + Soap/DAB	Wacom 13
8	Evergreen 486/586 proc U/G	Evergreen 8
9	MS Sidewinder Precision Pro	Microsoft 6
10	P75-180MMX Evergreen U/G	Evergreen -



Best of British

■ Intimidated by the thought of waltzing into a trendy West End art gallery? Then check out BritArt.com, "Britain's most dynamic internet gallery". The gallery recently sold Maggi Hambling's Jerwood prize-winning "Self Portrait" over the web for £11,000. In its first five weeks online, the gallery has sold £30,000-worth of art.

BritArt.com has quality reproductions of work by major British artists. Visitors can get information, as well as details on exhibitions both online and worldwide.

www.britart.com

BP in row over fake web site

British Petroleum was last month taking legal advice about a web site that looks like its own but is, in fact, operated as a protest by a disgruntled consumer.

The site uses the same home page as the BP site (www.bp.com) and a similar address (www.britishpetroleum.co.uk) but all the links lead to pages of information about a dispute with an Exeter-based internet consultant, John Bunt.

Bunt claims his car was destroyed by his local BP service station car wash machine. His site shows pictures of the damaged car and outlines the events since the alleged occurrence in August last year.

BP said the issue of the car's damage was being dealt with by the garage, while the garage owner said that BP was dealing with the matter. Bunt says that he has lost his job as a result of not being able to use

the car and that the web protest is his last resort. He is offering to sell his domain name for £7,000.

Mark Henderson-Thynne, domain-name manager at leading domain-name company, Netnames, said that BP could get the site closed down. He said: "They should talk to Nominet. What is being done here is in breach of Nominet's rules. Nominet is likely to take legal advice but I would expect them to put the domain on hold because it is causing confusion and could be libellous."

Since the recent legal case against a company called One In a Million, which was attempting to sell domain names of famous companies, it is also likely that Bunt could be stopped from selling the domain name he is using for his protest action. Bunt's site was not responding as we went to press.

Ken Young

Surfers should yakkety-yak *and* talk back

■ Northern Telecom (Nortel) is introducing technology that lets companies offer talkback services to visitors to their internet sites. The Internet Voice Button gives web surfers the option to speak to a live person if they want more information. Meanwhile, software on the web server passes information on to the site's owner. It could include the caller's identity and which page they are on.

Internet Voice Button initiates a call in one of two ways: using a second phone line (if the first is used for a dial-up connection) or using voice-over-IP (over the internet).

The second option requires a multimedia PC with software such as Microsoft NetMeeting.

The technology is still in an experimental phase. Nortel is currently completing trials together with TriNet, from Cary in North Carolina.

www.nortel.com



Explorer cruises past Navigator

■ Microsoft appears to be winning the UK browser war at a canter, according to two large-scale surveys by analyst Inteco.

The first, taken six months ago, showed the ratio of the main protagonists at 56 percent Netscape Navigator and 44 percent Explorer. The latest shows a dramatic swing, with 58 percent favouring the Microsoft browser.

Inteco interviewed some 6,500 people across Europe about a range of work-based technology issues, including the vital question about browsers. Previous figures were based on the browser used to visit particular sites, or the number of browsers downloaded from the Microsoft and Netscape sites. But both methods have come in for criticism because the counting of hits is open to fixing and the number of downloaded browsers does not necessarily tally with those in use.

www.microsoft.com; www.netscape.com

p36 >

Domain demand hots up

A new worldwide internet domain name registry system will go online this month amid a debate over US government proposals to reform the administration of the internet.

The Shared Registry System, created by the non-profit Internet Council of Registrars (CORE), is part of a plan to phase out government involvement in domain name registry and increase competition between

registrars. The US government is proposing that control of internet administration be devolved from the government to non-profit corporations governed by commercial, international and technical interest groups. But CORE fears the plan gives too much power to American interest groups.

The CORE system will initially administer a set of seven new generic

Top Level Domains (TLDs) — .firm, .shop, .web, .arts, .rec, .info and .nom. Network Solutions, which administers many of the remaining domains (including .org and .net) through an exclusive government contract, is expected to have that contract renewed for at least another six months at the end of March.

Susan Pederson



Retail therapy in a flash

Entertainment Express is a new web site which aims to bring the UK's top-selling CDs and videos direct to your home at high-street prices. You can browse the Top 50 Best Sellers, Top 50 Artists and a number of other categories, or jump straight to a title using the search facility. Entertainment Express runs a

weekly price monitor which, it claims, will allow shoppers to be confident they are buying at prices which match those in the high street. Fast delivery is guaranteed: an order made before 1pm will leave the same day. Post and packaging charges are included in the on-screen prices.

www.entexpress.com

Flowers Direct, with discount for mums

If you are thinking of sending flowers to someone special, you don't have to look further than



the net. A web site called Flowers Direct offers a range of bouquets and arrangements at, it claims, affordable prices. Next-day delivery anywhere in the UK is included. If you are stuck for a Mother's Day gift, Flowers Direct is offering PCW readers ten percent off flowers for the special day.

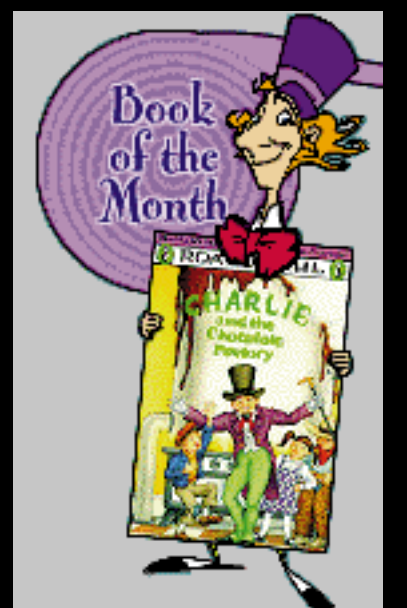
Etelka Clark

www.flowersdirectuk.co.uk/pcw

UK Top Ten web sites

There are some cracking sites in this month's chart-tastic Top Ten, provided by Yell www.yell.co.uk. Occupying the coveted top slot is the official Nestlé homepage of Willy Wonka and the Chocolate Factory — you'll like it, it's a really sweet site.

1. The Willy Wonka Candy Factory www.wonka.com
2. Polydrome www.polydor.co.uk
3. Discovery Zone www.discoveryzone.co.uk
4. The Bard www.rabbie-burns.com
5. Info Bubble www.homeusers.prestel.co.uk/smokingdrum/info/index.html
6. The Planet www.the-planet.co.uk
7. Lonely Planet www.lonelyplanet.com
8. Pakex 98 www.pakex.co.uk
9. BigBang Records www.bigbang-records.co.uk
10. Space Academy www.space-academy.co.uk



Site gives cash away to promote virtual money

A company is giving away money to publicise a system that could have a huge impact on the internet and the way we do business.

The Millicent system, developed by Digital, can handle transactions of as little as one cent over the net, allowing all manner of small-business activity that is not now possible because of high transaction costs.

You could, for instance, pay to view a particular page of a newspaper or hear a record on an online jukebox. This in turn could boost the quality of the services on

offer on the net by encouraging investment. Millicent uses virtual cash called Scrip which you buy in advance and spend like ordinary money. It is not the only e-cash system around but it is the only one users all over the world have a chance to try. Digital claims it is the only one which supports "microcommerce".

Digital is offering up to \$10-worth of Scrip to people logging on to its site at www.millicent.digital.com. You can use the money to buy from a selection of providers listed at the site.

A taste for Opera

■ Opera, the browser from the tiny Norwegian company of the same name, appeared in a new beta in January.

Opera has been winning fans for its tiny 1.9Mb footprint — no, that's not a misprint — and it will even run on a 386SX with 6Mb of memory. When you couple that with its speedy access times and customisable interface... well, you can almost hear Netscape and Microsoft gnashing their teeth.

Opera Software has a refreshing small-company ethos, too, giving its customers the chance to suggest new features and to vote on which standards should be supported. Unlike the competition, you'll



have to pay for it (US\$35) but that doesn't seem to be putting a damper on its popularity. So if you're sick of the browser wars, why not give the little guys a try?

Susan Pederson

www.operasoftware.com

Official: Nessie has webbed feet

■ A Loch Ness web site has been launched which promises to take surfers through the geography, history and attractions of the area. There is information on Nessie and tales from past and present covering the area of the loch. The next few months will see a directory of hotels, bed-and-breakfast accommodation, restaurants and tea rooms added to the site. The ability to book accommodation via the net is promised.

www.ipw.com/lochness

Hope I DIY before I get old

■ A survey conducted on the Motor Cycle World site has revealed some startling statistics about Britain's bikers. Over 50 percent are 30 years old or over and 34 percent of those confess to an "unhealthy personal interest in DIY". Bike manufacturers expect sales to rise by around 40 percent in 1998, with the key

market being 30-something weekend rebels. This is borne out by 54 percent of participants having desk jobs and 56 percent admitting that their idea of a top night out is going to the cinema, compared with only 20 percent who say they prefer to go clubbing.

www.erack.com/mcw

Internet shorts



Brochure service

A travel brochure order service from Yell (the Electronic Yellow Pages) and BP Travel Trade Services, is now available.

Users can search Brochurebank by holiday type, destination and tour operator, and request up to five brochures which will be sent to them free of charge anywhere in the UK.

www.brochurebank.co.uk

Bunkers online

Business people keen to improve their golf swing will soon be able to keep in touch, even when they're on the green, with a planned internet application from Centrics.



The company is developing a system that will deliver email to a golf cart using a global positioning system and PSINet's internet communications technology.

www.centrics.co.uk

The ball's in your court

Wimbledon wannabes should check out Tennis Today, the new online journal for tennis enthusiasts from Worldsystems.com.

The site builds on the success of the search engine site Tennis Org UK. Read about topical issues, check the latest scores, pick up some tips to improve your game or chat with others about the sport.

www.tennis.org.uk/tennistoday



Hark back, if you will, to the sixties, and a television advert featuring one of those parties where people used to call each other “man” and “baby” and things tended to be “far out.” A hippie character enters, all beard and hair, carrying a box camera. He saunters up to a girl: “Hey baby, like, can I take your picture, you dig?” The girl replies: “Sure man, I’m cool.” The deed is done, and he exits without another word. At this point, the girl’s face registers a look of profound disappointment, as if the Inland Revenue had suddenly declared that her free love constitutes a taxable perk. Fortunately, however, the day is saved by the arrival of a middle-aged gent in a pin-striped suit: “Excuse me, my dear, would you mind awfully if I were to take your photograph?” Thereupon, he whips out a cream-coloured thing about the size of a bread bin and snaps away. A second or two later, he pulls out a perfectly exposed photograph and becomes the hero of the hour. Now everyone wants to be photographed and said gent is the centre of attention. “Your memories develop in seconds, but last for ever,” intones the voiceover.

The camera arrived courtesy of Polaroid and, appropriately for the period, was called the “Swinger”. At one stage, you couldn’t go to a social gathering without having at least one stuck in your face. It was the novelty aspect that made it so popular. And the fact that, instead of having to wait a whole week for your photographs to be developed, you could see them more or less instantly.

There were drawbacks, though. First, operating the Swinger wasn’t quite as straightforward as the advert made out. For a start, getting the film into it was a major challenge. If you succeeded and took a photograph, you then had to pull on a white tab of paper that stuck out of the side. If all went well (and it regularly didn’t) this would cause a larger, black and yellow tab to appear. This you then had to extract in one smooth, non-jerking motion, producing a “sandwich” of developing photograph and light-proof plastic shielding. At which point you waited 30 seconds and prayed. Finally, you peeled the photograph away from the shielding and gaped in awe at the picture.

Sadly, compared to conventionally-produced photographs, the quality of those from the Swinger was often astonishingly bad: a mass of graininess and white streaks. And the film cost at least three times as much as you’d have paid for a normal film and developing. And the chemicals involved in the process were of such lethal toxicity that, if you stockpiled them today, UN inspectors would threaten you with sanctions or a Cruise missile attack. So, for all its novelty value, the Swinger went the way of psychedelic underwear and Herman’s Hermits.

I was reminded of all this last week when I spied a Fuji DX-7 digital camera sitting all alone in a Dixons window, squealing “Buy me! Buy me!” in one those plaintive, cutesy little voices that I’ve always found hard to resist.

So, an hour or so later, some £400 worse-off, I went with the DX-7 on a tour of Epsom.

“Hey baby, like, can I take your picture, you dig?” I asked a girl in the pub. She had no problem with this, was quite flattered actually, and once I’d taken a photograph of her, she insisted on taking one of me. She pressed the shutter and gave a screech — I often have that effect on women. In this case, however, it was compounded (for her, anyway) by the unexpected materialisation of my mugshot in the little LCD on the back of the DX-7. You can review all your photographs with this and delete those that offend you. A small crowd gathered to observe. Then the guy sitting next to me was sufficiently intrigued to want his picture taken. Then the guy next to him. Then the camera started to circulate and, before long, I’d amassed a collection of a couple of dozen colourful vignettes and tableaux of everyday pub life. Together, of course, with the obligatory bare-arse shot from someone.

So, forget repartee classes and spray-on pheromones. If you want to make a hit on the social scene this year, I do believe a digital camera with integral LCD is the thing: the Swinger for the Millennium. It could be argued, I suppose, that £400 would buy you a heck of a lot of pheromones and quite a bit of quality repartee. True. It would buy you a very good conventional SLR, too, for that matter, offering far superior picture quality



Michael Hewitt

Sounding Off

The swinging sixties were caught on camera with the then-new phenomenon, the Polaroid Swinger. Michael Hewitt reflects on this and the nineties equivalent.

than you could ever get from a coarse 640 x 480 CCD. And, I’ve calculated that for the DX-7 to pay for itself in terms of saving me money on processing, I’ll have to shoot nearly 2,400 photographs. That’s the equivalent of a roll and a half every week. Considering that, hitherto, a 36-exposure film has usually seen me through two Christmases, it looks like I’ll have to become a regular David Bailey very, very quickly.

In the meantime, therefore, if someone can suggest a practical use for this new toy, I’d be very grateful. So, no doubt, would my bank manager and my accountant.

■ Mike.hewitt@mjh1.demon.co.uk

PC companies and their PR people say I must be jinxed when I tell them their product gives problems. I refuse to write about new hardware and software merely on the strength of having seen it run on the company's own demo machines: I want to try it on my own kit, and if something doesn't work I want to find out why and how to fix it. That way I can eliminate my own mistakes and steer others clear of similar problems.

One reader had been struggling to find out why his modem had stopped working. He broke for a cup of tea and read my item about Psion's PsiWin [*PCW Feb 98*] which hijacks all COM ports unless you tell it to stop. Like me, he wondered why on earth Psion makes this hijacking its default without providing a big warning on-screen. At least he got things working again.

Philips CDD 3610 (also badged by HP) uses Adaptec's Direct-CD software to store data from the hard disk on a blank write-once CD-R or erasable CD-RW. Adaptec's Easy-CD software lets it make audio recordings on blanks that are cheaper than consumer blanks, and without SCMS which stops copies of copies. It's a great tool, but fitting it to an existing PC can be a nightmare. Manufacturers now make the manuals slim, because they think this makes the product look simple. In reality, it just means that vital information is omitted.

Opening the PC and sliding the bare ROM drive into the metal frame is the easy part. Even so, it can be a tight fit with screw holes inaccessible. The ribbon leads may not be long enough for easy access. The ribbon plugs should fit only one way round, but may fit either way. The manual recommends connecting the ROM recorder as the slave to the CD-ROM drive, with both on the secondary IDE port and the hard disk on the primary port. But, says the Philips Helpline, if you have a slow CD-ROM drive, make the recorder the master and the ROM drive the slave. All this assumes you know which lead goes to which IDE-port socket. It's not explained, but you'll probably also need to re-set the BIOS (hit Del when starting the PC) so that the Secondary ports, 0 and 1, are set to "auto"; Primary 0 should be at "auto" and 1 set at None. Got it? Good. It's not mentioned, but if you are running an anti-virus program you should disable any option to open files before writing, or CD-R operation slows dramatically. I am told that the firmware for the drive may need updating from Philips' web site.

Seagate Backup software puts £70 on the price of the ROM recorder so it seems reasonable to try and install both. But installing Seagate Backup after Direct CD crashed my PC. I got it working again by starting Windows 95 in Safe mode and uninstalling the Seagate software. I tried again, from a second Seagate disc. This time the crash was so serious even Safe mode couldn't help and I had re-install Windows from scratch — it cost me a day of working time. "We haven't actually tried installing both together," admitted the Philips Helpline.

In general, though, the Philips Helpline is skilled. A reader tells how, although he has ten years of experience installing and supporting systems, he had to make at least six calls to the HP Technical Support HelpLine who admitted it was unprepared for the product. His problem, it turned out, was the PC's IDE driver software.

Adaptec's Direct-CD loads as a device driver rather than from startup files, so conflicts occur before the PC is in a state which allows system modification. Philips thinks the trouble with Seagate may arise if the PC's hard drive is compressed. Perhaps this is why Seagate has ignored my question. We could be opening a can of worms. Adaptec is on the case and I'll report when the diagnosis is firm. Until then, if you want CD-R, buy a PC with drive and software installed or, if you want to fit it yourself, be aware that you may need help from the maker's Helpline. Logitech's Freescan scanner is easy to install by daisy-chaining onto the external printer port. The shock comes later. It comes with filing software called PaperMaster, from Documagix. This scans paper documents and indexes them in a virtual filing cabinet. It all works well but the bundled software limits the number of filing drawers which can be created. Most will discover this only after they have used the system for a few months. When users run out of drawer space they are referred to a Documagix web site which offers an upgrade to buy, but only to US



Barry Fox

Straight Talking

Is Barry Fox jinxed? No. So how come many new products work OK on companies' demo machines yet don't perform on his or other users' kit? Strange.

users. Europeans find a message in one of the virtual drawers offering an upgrade for £60, from an address "listed on the back". But the Documagix dimbos have scanned-in only one side of the order form; so, no address. Logitech's Helpline gave me a number for Documagix, so I called and left a message asking how I could buy the upgrade. I never heard back from them.

I'm lucky: Documagix sent me a copy of the upgrade from the US. Others may not be so lucky. Hopefully, Logitech will now kick Documagix butt. Until then, it is real-world customers who are jinxed, not me.

■ 100131.201@compuserve.com

Just like any other purchase, when it's time to sign on the bottom line for a PC, the question is: what about an extended warranty? It now seems widely accepted that extended warranties for most household goods are rip-offs. With prices at a non-trivial percentage of the purchase cost, it makes sense to take on the risk yourself. You play the part of the underwriting insurance company, paying up if something goes wrong but otherwise reaping a profit.

For a large business, PCs can be treated similarly. On the scale at which these firms are working, warranties are more trouble than they are worth, so the basic warranty is often administered by a third-party maintenance contractor and no-one bothers with extensions. It's a different picture, though, for small- to medium-sized enterprises. Here, the expense of a PC is a significant part of the capital budget, and losing one PC is not a small drop from a huge pool, but half the lake. For them, the extended warranty can be a lifeline, enabling the firm to keep functioning when a critical resource breaks down.

For that reason, whenever I am asked by a small business to recommend a PC manufacturer, I tend towards the conservative; I know how much money you can save by avoiding the big names. Only the other day, a delivery man, discovering I wrote for a computer magazine, told me how he had managed to put together a Pentium 166 with all the trimmings for around £250, thanks to a system board he picked up in a pub (or something) and various deals. That's fine if you are doing it for fun, but it's not a good approach for a business when you know you want reliability and support.

As I run a business myself, it is interesting to consider a recent practical experience and whether or not it brings my strategy into disrepute. My main PC is a Dell with an extended warranty. I can't keep my business going without it for more than a few days. Not long ago it started to behave peculiarly — Windows would suddenly hang, locking up the machine entirely. This happened more and more throughout the day. When I tried to restart, the power light flashed on and off. The hard disk started but the screen didn't activate, and it never got as far as the beep that signals booting.

I was reasonably confident that a software problem couldn't cause such an early failure, so on Wednesday I rang Dell. In a moment of thrift I had originally chosen a return-to-base warranty but things still happened speedily: the machine was taken away Thursday and was back the following Tuesday (7am). So far, so good. Dell had replaced the system board so all should have been well; in fact, it was only the start of my problems.

When I switched on the PC, my second hard disk, my CD-ROM and a number of boards weren't working. I panicked a bit. There was nothing obvious in the

“...it would have been wiser to go for on-site cover”

Windows 95 Device Manager so I restarted the machine. Almost by chance, I decided to check the BIOS setup. Neither the second hard disk nor the CD-ROM had been initialised. I did this, restarted and everything was back. It took only half an hour, but things could have been a lot more painful without that lucky guess.

A little later I tried, unsuccessfully, to print a document. I tried a different printer. Same result. I went out and bought a new printer cable. Same again. Then, at some point, I noticed that the feed light on the printer came on when the machine was booted. It looked like another hardware problem. Dell was sympathetic, and had an engineer on my doorstep in less than 24 hours. He was all ready to replace the system board again but first decided to take out my expansion boards. As he did so, he noticed something strange: the system board was not screwed in; not a single screw. This meant poor earthing, possibly enough to throw a parallel port. He screwed it down, and the printer started working.

So the question is, should I have bothered with the extended warranty? I would still answer “Yes”, although it would have been wiser to have gone for on-site cover.



Brian Clegg

Business Matters

New PC? What about a warranty? Corporations aren't bothered, but for smaller businesses it can be a lifeline. Brian Clegg has a cautionary tale to tell.

I have always found Dell warranty support (dealt with, in the UK, by Wang) to be prompt and effective. I have no evidence that this wasn't a one-off error, and Wang has promised to check back at its facility to ensure it won't happen again.

There is no doubt that the problems I suffered were disconcerting, but the outcome — functional again in four working days — was nevertheless better than I could have expected by another route.

The fact is, when the business depends on it, you cannot afford not to be covered.

■ BrianClegg@msn.com



Tim Nott

There's nothing like a new alternative input device as a palliative for boredom, and this month I was privileged to have a couple to play with.

First out of its packaging was the Philips SpeechMike, billed as "The Ultimate Input Device". This comes with a single sheet of instructions and two floppy disks. I had a few difficulties installing this, which I will charitably put down to a bad brain day on my part, but the opening message of setup, "Let's install the incredible (sic) recorder", didn't inspire

confidence.

The SpeechMike is an elegant artefact incorporating a trackball, microphone, speaker and various buttons. It was rather uncomfortable using it flat on the desk: the ball and default mouse buttons sit too close together and I had to manipulate the ball with my middle finger while using my fore and ring fingers for the buttons.

Picking it up was much better — it fits comfortably in the hand, and the left and right mouse buttons are duplicated on the rear of the device so I could activate them with my forefinger while caressing the trackball with my thumb and murmuring sweet nothings into the microphone.

Unfortunately, the ergonomics are let down by a heavy-duty coiled cable whose weight and elasticity combine to strain hand, wrist and arm. The extra buttons mentioned earlier, of which there are six, are

From the desktop

Tim Nott looks at weird and wonderful input devices, from SpeechMate to Power Cat. Follically-challenged readers can hark back to good hair days with WigOut.

complemented by the bundled software. Although the SpeechMike is designed for use with Philips Speech Recognition, this isn't included. Instead, you get a sound recorder and a utility for programming the buttons to launch applications, produce key combinations or insert short text strings.

Both applications are poorly documented and fairly useless. Maybe I've missed the point and this is also meant to be some sort of fitness or exercise apparatus. But as a microphone and as an input device, it seems a classic case of reinventing the wheel — and in a counter-revolutionary square shape.

Cat call

Onward to the Cirque Power Cat. This is a touchpad which exhorts you to "Replace Your Mouse and Enter a New Era of PC Interaction" and "Surf the Internet Like Never Before." It measures about 115mm x 135mm, with an active area of 75mm x 50mm. It comes with a strange metal stylus that has a swivelling flat tip and a wrist cushion.

Installation involves turning off the PC, unplugging the current mouse, plugging in the Power Cat and switching on. And it works, much to my delight. Slide your finger around the pad and the cursor follows on-screen. There are buttons either side for left and right clicking and dragging, or you can tap the pad in the top right corner for a right click or anywhere else for a left click. So far, excellent, so on to the two floppies.

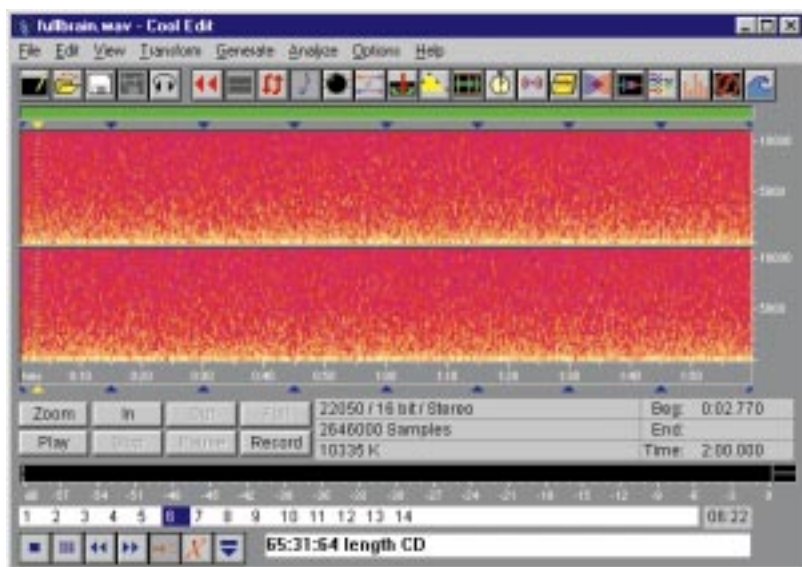
These contain the Control Panel stuff for the Power Cat and this really is rather clever, as each edge of the pad has an additional function: dragging along the right or bottom edge scrolls, dragging along the left edge zooms (in compatible applications), and when you drag along the top, it pages back and forward in Internet Explorer or Netscape Navigator. It generates jolly little noises as it does this which, strangely, come from the PC speaker rather than whatever is plugged into the sound card.

Getting back to the pen, this is really just a finger substitute that gives you greater control for drawing or painting applications and neatly brings us to the other piece of software, the Signature Capture. Sign your name with the pen (or a finger, if that's your usual method) and you can save this and paste it into any graphic-supporting application.

I must admit to having rather a soft spot for the Power Cat, although after an hour or two it made my wrist ache. Finger-sliding and tapping takes rather more effort than normal mousing and clicking. And although it's much better than a mouse for drawing or painting, the pad isn't really big enough for true artistic freedom or accuracy, so for now I think I'll stick with my current input devices — a Microsoft wheel mouse for general use, and a Wacom Artpad for arty input.

The Twiddler

Finally, however original these devices might be, they don't hold a candle to the pride of my collection of off-the-wall input devices, the Twiddler. This first appeared in 1992 and combines the function of mouse and keyboard. It's a rat-sized device, with 12 buttons on its belly and a few more on the back of its head. You strap it to one hand, then tilt it to send the pointer scurrying across the screen while manipulating the buttons on its head with your thumb for clicking. "Chording" the buttons on its underside generates keystrokes. I've never managed to do anything productive with it, but others, allegedly, have



Beta-test your brain with Cool Edit

as its name suggests, provides wallpaper for the ears, with an ever-changing sequence of semi-random tunes. The real beauty of it is not just that it sounds relaxing, but you can spend many happy hours configuring its options and trying different effects.

From the same Syntrillium stable comes Cool Edit. This is a shareware digital audio editor: if you consider what applications such as Paint Shop Pro do with images, this does a similar job with sounds.



Big hair day — find the true you with WigOut

mastered the beast. The rumour is it that it's set to make a comeback in the field of wearable PCs [see *Futures*, PCW March 98], so watch this space.

Let's all wig out

Let's move on now to something a little more serious. Connectix WigOut can help you find your true hair. Grab a scanned head-and-shoulders photo, set the line of the temples and the outline of your head and shoulders, then try on a vast range of virtual wigs in male and female styles. There are also beards, moustaches, glasses, hats and jewellery. If you're feeling self-conscious you can practice on the sample files which include male and female models and the Clintons. Pointless, but great fun.

Music to the ears

Collectors of desktop trinkets may remember Windchimes, which came out just over a year ago. This,

Except that it's insanely more complicated. You can take a sound clipping, or create one from scratch with a pure-tone generator, white, pink or brown noise generator or a telephone-tone generator.

You optimise recordings with noise filters, add echo, reverb and seventies-style flanger effects. Then it gets even more convoluted with compression, distortion, frequency analysis, spectral view and a whole load of stuff I will cheerfully admit to being totally beyond my comprehension. I did, however, have fun with making tunes from short sound clips and violating not just the copyright but the reputations of several artistes on CD. The best bit, though, is a set of idiot-proof hands-on instructions for creating a 20-minute brainwave synchroniser. This takes random "pink" noise

and overlays it with low frequencies designed to resonate with the natural frequencies of the brain. The idea is that listening to this can change your state of awareness.

And, I must say, it works. In a few minutes I had gone from the normal working, beta state (alertness, stress, anxiety) down through the alpha state (8-12Hz, light relaxation, super-learning, positive thinking) into the theta state (4-7Hz, deep relaxation, meditation, increased memory and focus). Fortunately, by this time I had just come to the end of the column, so I was able to wander off for a little delta activity (1-3Hz, deep sleep, lucid dreaming, increased immune functions). If I wake up in time, I will be back next month.

PCW Contacts

Cirque Power Cat www.cirque.com
 WigOut www.connectix.com
 Cool Edit 01889 564601
www.syntrillium.com



Letters

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or fax 0171 316 9313

400 years a-leaping

For the information of Simon Booth (*Letters, PCW March*) a leap year is any year that is exactly divisible by four; a rule that is ignored every 100th year unless the date is exactly divisible by 400.

1900AD was not a leap year, being divisible by four but not by 400, while 2000AD will most certainly be a leap year as Microsoft and Gateway clearly know!

Brian Kilby
brian@bjkilby.demon.co.uk

PCW replies: Yep, hands up, we admit it was our mistake in not replying to Simon Booth's letter to confirm that there will indeed be a February 29th 2000. Thanks to Brian and the other several thousand eagle-eyed readers who almost brought our email accounts to a standstill over the past few weeks! Your response has even dwarfed Mike Tinning's light-sensitive mouse concerns of November last year.

Scotland's for me!

Your article in the January issue entitled "Efficiency drive" was interesting but failed to mention the Scottish MANs. Admittedly these are only used by the higher education community and a small number of approved organisations in Scotland, but I don't think that is an excuse to ignore them.

The Scottish MANs consist of four metropolitan-area networks: ClydeNET around

Glasgow, AbMAN around Aberdeen, EaStMAN around Edinburgh and St Andrews, and FaTMAN around Fife and Tayside. All run at 155Mbps ATM and all are interconnected.

This is the fastest network connecting all the universities within a country. Finland has connected its universities together at 33Mbps, and in the United States they are slowly connecting theirs together.

The UK leads the world in using network technologies to advance education and research. We have to slow down to go to Europe or the US. Nice to be in front, isn't it!

Dr Paul Rattray
Paul@icbl.hw.ac.uk

Costs to Scots

I see [*Newsprint, Feb*] that: "I-R dongles which plug into PC serial ports cost upwards of £70 in England." How much do they cost in Scotland?

Tony Gurney
t.gurney@strath.ac.uk

PCW replies: Sadly, commercial infra-red ports cost the same ridiculously high amount in Scotland as in England. It really is about time PC manufacturers fit the required hardware (costing approximately £2) to their systems which, more often than not, have support for IR on the motherboard.

We do hear that Scotland has some pretty fast networks if you prefer that route of communication...



They're not coaled at Virgin Net (see "Virgin on the tropical")

Greece lightning

Michael Hewitt's column [*Sounding Off, PCW Feb*] contains some misinformation. In the first place, there are over 25 ISPs in Greece and it is possible that if he had investigated further he *might* have struck lucky. He certainly did not try very hard.

In the second place, neither I nor any of my friends in the US (and the UK) have experienced problems with the quality of international telephone service. I moved to Greece (from the US) in autumn 1996 and the very first thing I wanted to do was get on the internet to keep in touch with my friends and family at home. I had already "shopped around" while I was in the US and within a day I was up and running with EEXI.

I have never had any trouble with the quality of phone service provided by OTE. This includes voice, fax and data. I have a

33.6Kbps modem and I use WebTalk with a Connectix camera, and the picture quality is as good as it was in the US.

Mr Hewitt is correct on one point, however. There are no reliable "international" ISPs so one should be prepared to make international phone calls if they wish to stay "connected" during their travels. I think the last paragraph of his article sums it all up quite well.

JD Moore
gisman@eexi.gr

Michael Hewitt replies: There may well be over 25 ISPs in Greece. However, I personally didn't need to test them all. My brother's company, based in Athens, had already done so and recommended Helas Online as being the least worst of them. As for international lines, I can only say that you must be very lucky. Whenever I phone my brother, the quality is

usually akin to what I used to experience from one of those tin can and string "phones" of childhood days. The quality (or, rather, lack of it) of the Greek telephone service in general has persuaded hundreds of thousands of the natives to switch to cellular phones.

Virgin on the tropical

How we at Virgin Net laughed at your March *Newsprint* story, which stated: "...power systems at a site in London's Soho suffered severe spikes when staff plugged in electric fires and kettles to cope with the cold weather."

An investigation is under way to find out who owns the mystery electric fire or even a kettle. Anyone who visits our office will know that we have been basking in equatorial temperatures throughout this winter and mounds of clothes decorate the office as we all strip off on entering the building.

Anyone trying to plug in even more heat would be lynched. Oh, we also have a state-of-the-art cappuccino and tea machine, so kettles are a no-no as well.

Lisa Francis, PR Manager,
Virgin Net
lisa@london.virgin.net

DVD'ed we stand

I am greatly interested in the DVD technology and was wondering if you could tell me what the six regions are? I know region one and region two but could you also tell me the location of the other four regions?

Michael Tuson
106627.421@compuserve.com

PCW replies: As you correctly state, there are six major DVD regions, and discs encoded with a specific region, such as a feature film, can only be read on a player compatible with

Copy writers: How Xerox lost the plot but kept its fans

Copy cats

Reference Keith Hunniford [*Letters, February*]. Yes, Xerox should be praised for developing the icons/mouse concept for computing, and for its very advanced desktop publishing system. However, it did not copyright the idea and this allowed Apple and Microsoft to adopt the idea for the PC market. Additionally, Xerox neither marketed nor priced its system effectively, expecting companies to come to them requesting equipment. Also, Xerox did not keep pace with computing development like 286, 386 and 486 standards, and upgrading floppy and hard disk specifications.

Because of all this, Xerox Documenters and 6085 machines are now obsolete and can be obtained free by anybody who wants to pick one up off the various skips around the country, whereas a matter of seven years ago they would have cost you something in the region of £14,000.

Xerox was also too late in trying to put its system onto the PC. Its system, "GlobalView", was launched at too high a cost and, with little or no advertising, it did not stand much chance. It will cease to be updated and will

not be supported after the first quarter of 2000. It is a pity to see this system being abandoned, because the Xerox text editor and drawing packages, to my belief, are the best on the market.

Sid Rust

sidrust@globalnet.co.uk

Seventies heaven

From my recollection, having been at Xerox and Rank Xerox from 1972 to 1985, the Xerox GUI was working at PARC in 1973. I saw it in the basement of the old PARC building: in the dark, as the screens were not bright in those days.

I remember it had a portrait-orientated screen (odd in those days) and a removable disc cartridge (everyone had their own). Unfortunately, your correspondent is right about the old Xerox attitude towards "anything not a copier". The "tonerheads", as the US East Coasters were called, just couldn't understand the West Coasters — I know, because I spent three years there. Still, it was a great company, and a great place to be part of in the seventies.

Colin Jones

pub02016@innet.be

that region. As mentioned in *March's Home Entertainment feature*, however, it is possible to install software drivers for multiple regions on some DVD ROM drives, and specialist AV dealers may be able to modify a domestic DVD player, too. The answer to your question in the meantime is as follows:

- **Region 1** North America
- **Region 2** Europe, Japan, Middle East, South Africa
- **Region 3** Southeast Asia including Hong Kong
- **Region 4** Australia, New Zealand, Central and South America
- **Region 5** Northwest Asia and North Africa
- **Region 6** China

Bear in mind, though, that regionally-coded movies may conform to either PAL, NTSC or SECAM television systems, and therefore a compatible set will be required in order to display them.

Exchange and mart

In response to the letter from Chris Elliot and his IBM MCA (*Letters, PCW March*) I am an enthusiast of the IBM MCA machine: I have two (well, I did until my mod80 died from a lack of power) and have plenty of cards. If he doesn't want it, I might take it off his hands.

Mark Davies

markuk@ibm.net

Raindrops keep falling on my screen

I have a 17in Vivitron monitor. Something appears to have been splashed onto the screen — possibly a sneeze, or perhaps someone sprayed furniture polish on it. Whatever it was, it has removed bits of what looks like a coating from the screen. It is now like looking through a window with raindrops glinting in the sunlight. I cannot remove the marks using the recommended "soft

cloth lightly moistened with a mild detergent", or even with commercially-available screen cleaners. Have you any suggestions, please?

Stephen Crump

crumps@cableinet.co.uk

PCW replies: You should be careful when cleaning the surface of a display. While some are made of just plain glass, others feature sophisticated anti-glare coatings which could easily be removed if the wrong type of cleaner is applied. You should first call the manufacturer to find out what coatings are used (if any) and which cleaning system would be suitable. If your monitor subsequently suffers from glare, you could investigate a glare guard to minimise reflections. The anti-glare products and dedicated cleaners used by PCW are available from Computing Plus on 01993 881912. ■

Gadgets

Compiled by Adam Evans. Photography by David Whyte.

A yen for pocket PCs

It's just not fair: the Japanese get all the best gadgets. While we were feeling quite satisfied with getting a proper UK Toshiba Libretto, a quick trip to Japan revealed a whole load of pocket-sized Windows 95 PCs we rarely see imported. Take NEC's mobio NX for instance (we'd love to) in one of its three configurations ranging from 218,000 to 248,000 Yen (approx. £1,000 to £1,200). The top model features a Pentium 120MHz, 32Mb EDO RAM, 1.6Gb hard disk, 640 x 480 STN display, Type II PC Card slot, full Windows 95, all in a package weighing 800g and measuring 210 x 141 x 28.5mm ...at least, we think that's what it says in the Japanese literature.

Price Not available in the UK

Contact NEC www.nec.co.jp



Will the Conqueror?

According to Primax, its new Conqueror Gamepad will enable you to "fight the toughest computer games with devastating effect". We

usually find that jumping up and down on the box will take the sting out of most computer games but if you actually want to play them, this gamepad could be just the job. The sleek ergonomic Conqueror has ten buttons, each separately programmable to mimic any keyboard or joystick command, designed to control the most sophisticated and advanced games available on the market. Along with the usual eight-directional control capability, there are three optional turbo fire buttons.

Price £14.99 (£12.76 ex VAT)

Contact Primax UK 01235 546020 www.primax.com.tw

Speakers' corner

Labtec claims its newest speaker system, the LCS-2420, features cutting-edge technologies and design advancements. Ordinary bass speakers often suffer from distortion at high volume levels. Labtec's Dynamic Bass Equalisation system monitors the sound content and adjusts the bass, resulting in deep, distortion-free, sound whatever the volume. The satellite speakers are each rated at 3.5W RMS. The subwoofer is rated at 13W and has a Laminar Flow Port (no, we don't know what that means, either) which promises to give a clearer, smoother, sound for both games and music.

Price £59.99 (£51.06 ex VAT)

Contact Labtec 01252 629900 www.labtec.com



There's a moose loose about this hoose

It was bound to happen sooner or later. We've been complaining for years about how dull the average computer is to look at. The Monimal Trading Co has taken us at our word, launching four types of animal costume for monitors. You can turn your monitor into a cow, lion, sheep or moose and each Monimal comes with four screensavers for adding a "wacky" face, animation and sound. Monimals are available for most 15in and 17in monitors and can be found in high-street shops, including Dixons, and Comet.

Price £14.95 (£12.73 ex VAT)

Contact The Monimals Trading Co. 0171 734 8939



Flip flop or flipped disk?

This Amacom Flip Disk's funky blue casing holds a tiny 2.5in 3.2Gb hard drive (6.4Gb when compressed). At 188g it is light enough to carry in your pocket and is designed to make data transfer between PCs and laptops easy.

It connects via the parallel port and draws power from the keyboard adapter on a desktop machine, or slips neatly into a PC Card slot on a laptop. Amacom bills it as "The only such product that can be used aboard an aeroplane". When it looks as good as this, though, why restrict it to just planes?

Price From £350 (2.8Gb) to £555 (6.4Gb)

Contact Amacom 0181 993 7373 www.amacom-tech.com

Building the future

Lego has announced Lego MindStorms Robotics Invention System, a definite contender for the bestselling present this coming Christmas. MindStorms takes the Lego bricks we all know and love to a new level with the addition of a smart electronic brick which can communicate with sensors and operate motors and levers. The user uses a simple visual programming language to program the brick, then downloads the instructions via an infra red transmitter.

All kinds of autonomous robots have already been built using the system, including card dealers, sweet dispensers and roving ping-pong ball throwers. A number of expansion kits will also be available, including a Mars Pathfinder kit with an on-board camera. Lego Mindstorms is due for release in the autumn.

Price around £150 for starter kit and £50 for expansion kits

Contact Lego 01978 290900 www.lego.com



First Impressions

Windows 98 in final beta (p72), two whopping notebooks from Compaq (p75) and Gateway (p76) and a Canon A3 inkjet (p80) that leads you into the realm of "photo-realism". FreeHand 8 (p86) improves, Goldmine 4.0 (88) sparkles and Sage 98 (p92) satisfies.

■ Software

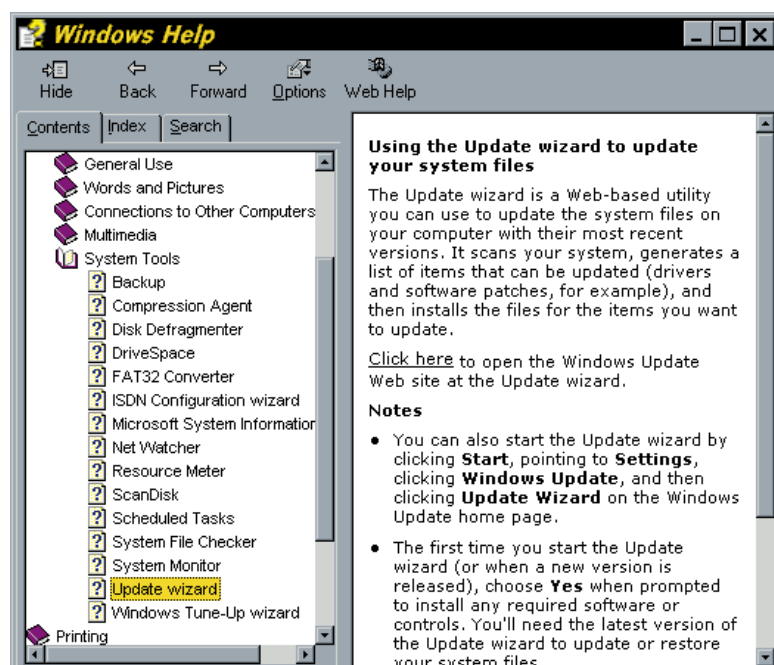
BETA

Microsoft Windows 98

With a web browser at its core and Active Desktop a flexible friend, a new Windows wades in.

Although Windows 98 is still at Beta 3, this version is said to contain the final feature set. Unlike the OSR 2 release of Windows 95, this is not restricted to new PCs. You can upgrade from Windows 95 or leapfrog straight from 3.1. If you do the latter, you have the option of retaining the old system and "dual-booting" between 3.1 and 98. You can also install alongside NT4 and dual boot, but you can't do this with a Windows 95 installation. You can, however, save your existing Windows 95 system and settings in a compressed file, and return to this by uninstalling Windows 98.

After an initial false alarm about a "damaged cab file" (wonderful sense of humour these guys have), the upgrade went smoothly and took around 45 minutes, and all my hardware and custom settings survived. One very welcome touch is that when you make a boot floppy, it now includes generic SCSI or IDE CD-ROM drivers, so if total disaster strikes and you need to re-install Windows from the CD, you don't have the Catch-22 situation of being unable to access the CD-ROM drive.



A much neater all-in-one help window

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VNU European Labs



VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and

for the most part are based around industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the Sysmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Ratings

★★★★★	Buy while stocks last
★★★★	Great buy
★★★	Good buy
★★	Shop around
★	Not recommended



Above Control Panel in web view

Right Customisation — a tweaker's delight

Hardware

Let's first have a brief look at hardware issues. There's a whole raft of new standards and gadgets emerging, and Microsoft seems to have catered for most of them. Support for DVD, USB, IEEE 1394 (Firewire) and Smartcards are all in place, and there are a variety of ways of mixing broadcast video and web content with a video capture card installed. You can have multiple displays — up to nine AGP or PCI graphics cards

and monitors, each with its own resolution settings. Enhanced power management (ACPI) will improve battery life on portables and on suitably equipped desktops allow "Instant on" from a standby mode.

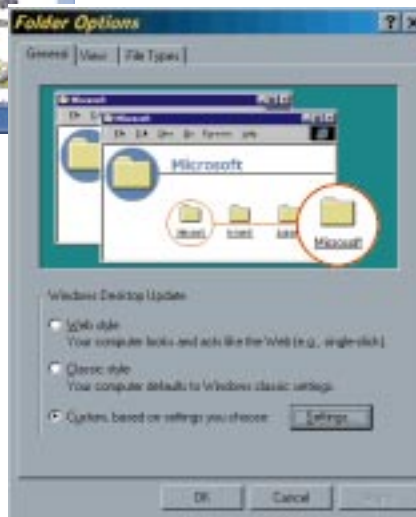
Fat 32 offers more efficient management of hard disks. First, the old limit of 2Gb-per-partition is removed. Secondly, it uses smaller "cluster" sizes, resulting in less wasted space.

Fat 32 isn't new — it's an optional

feature of Windows 95 OSR 2 — but this is the first time it has been offered as an upgrade option. There's a tool to convert existing FAT 32 partitions but this won't work on existing partitions less than 512Mb — you'll have to reformat the disk from scratch. Nor can you convert a compressed partition to FAT 32 or compress a FAT 32 partition. And there's a new Winsock, which supports protocols other than TCP/IP.

Microsoft has shaved two seconds off booting by the expedient of doing away with the pause that lets you hit F8 to display the boot menu. Instead, you hold down the Control key during the Power-on self-test. Unlike the F-keys, this doesn't cause problems by filling the keyboard buffer. To realise the full promised performance gains you need to run the Tune-up Wizard.

One important part of the Plus! pack was the System Agent, which brings us neatly back to the Tune-up wizard. This will run regular scheduled sessions of Scandisk (fixing hard-disk errors such as cross-linked files or lost clusters) and Defrag (optimising the way programs are stored on disk). Nothing new there, but there's now a third optimiser, Disk Cleanup, which will optionally remove temporary files, cached web pages, leftover ActiveX components and other detritus. Incidentally, if you do have an "irregular" shutdown, whether by system crash, power failure or someone simply switching off the PC, then Scandisk will run automatically next boot to clean up the mess.



Two other new health features are the System File checker and the Web Update wizard. The former examines system files and restores any that are damaged or outdated from the installation CD. The latter connects to the web and automatically updates drivers and other components as needed. I did actually try this, and though there was nothing new on offer, I got a warning that the web page contained a potentially unsafe ActiveX object. This, if I may say so, is typically Microsoft. Make it easy, make it simple, then hit them with the bludgeon of bafflement.

Start menu, Taskbar

There are some changes to the Start menu and the Taskbar. One small improvement is that items in the former respond to a right-mouse click just as in a folder, so you can delete or rename a shortcut instantly. You can also drag menu items to re-order them, instead of being stuck with alphabetical order.

More radical are Toolbars. You can have Toolbars in the Taskbar in much the same way as they appear in applications, or drag them out to free-float on the Desktop. You can then use them to launch applications, show the contents of the Desktop as small buttons, jump to selected links or type in a URL. Nothing, really, that you couldn't do before through the menu or Run command, but just a different way of doing it. One definite improvement is a View Desktop button. It's functionally equivalent to the Minimise All command but much faster.

There's a new My Documents system icon on the desktop. I have a long-held loathing for applications that insist on creating a My Documents folder, but this actually cures the problem, as you can point it at any folder you want. Any applications, such as Windows Paint and WordPad, that don't make their own folder arrangements, will default to saving here, and you can also rename (or remove) the icon itself.

The Active Desktop is probably the most drastic change although, once again, this isn't new, as IE4 enthusiasts will know. For the rest of us, let's start with Channels, a small toolbar linking to various web sites that you choose to "subscribe" to, i.e. customise the information you'd like to receive. One click on a Channel will connect to the web and launch the relevant page in full-screen view. Next comes a variety of ways in which Internet Explorer integrates with the regular Windows interface.

First, let me reassure you that all this is optional. But at top level, you can elect to have the Windows Explorer interface, and your desktop, have a web look-and-feel. All this can be implemented globally, on a by-folder basis and on a by-feature basis. For example, you can add toolbars to any folder view: start Control Panel,



Left You can fiddle with your desktop setup to your heart's content

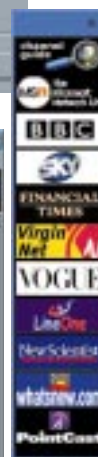
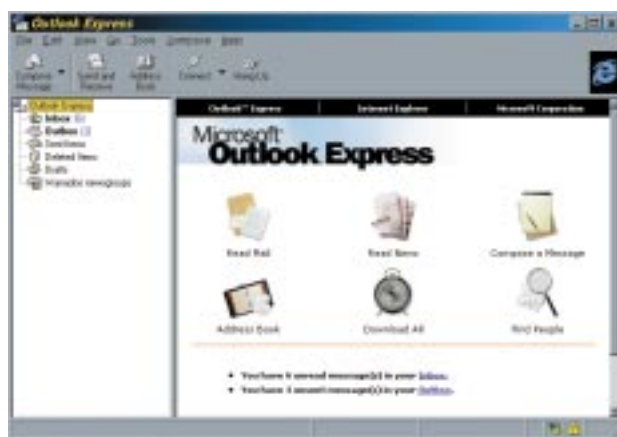
Below Tune in, turn on...

Below, left A better outlook — bye-bye Exchange

want to see my favourite web sites alongside a folder full of business letters?) and at worst infuriatingly obtrusive and bewildering.

Customising the options can involve bizarre leaps between the Display and Folder settings, and can keep a dedicated settings-tweaker amused for hours. Actually getting some work done is a different matter. On the other hand, if

you're the sort of person that likes having the telly and the radio on as you work, you may love it. One consolation, however, of this unholy alliance is that Outlook Express replaces the unlovely Exchange as an email client. You also get a "light" version of Front Page for creating your own web pages.



Bits and pieces

Good news for Notepad users: you can now change the font, enable wordwrap as a default option and use the MS Mouse wheel. Good news for Office 97 users: Quickview now works again, WordPad will read Word 97 files, and the mouse wheel at last works in the File Open dialog. Bad news for fans (if there are any) of the Character Map applet: it's still blissfully unaware of any Unicode fonts. Good news for fax users: there's a new Kodak Imaging applet that replaces the awful Faxview, and lets you view and annotate not just faxes but bitmap files or images straight from a scanner. Good news for those in need of Help: the Index, Contents and Search tab window is now attached (though it can be hidden) to the main window, saving a lot of shuffling around the screen.

Good news for programming buffs: Scripting Host allows ActiveX scripting from the command-line or Windows, without embedding it in HTML. Bad news for the rest of us who haven't a clue what this means but were hoping for an easy-to-use replacement for the Windows 3 Recorder.

Finally, for trivia lovers everywhere there are new versions of the Microsoft sound and Logoff wave files, by Ken Kato and Stan LePard. Both are over 600Kb — even trivia has been hit by inflation.

Tim Nott

say, with a bar containing standard web links and a URL or local "Address" panel. More usefully, you can split the folder window so the left-hand side shows property information. A further window split lets you show the web search tools, History folder, Favourites or Channels alongside the current folder.

Single-clicking on icons, as with a web link or menu item, makes sense but it takes some getting used to. What's effectively happening is that moving the pointer over the icon is the equivalent of the old single click — that is, it highlights the file. If you want to select several files, then Shift and point is the equivalent of the old Shift and click for selecting contiguous files, and Control and point for non-contiguous ones. You have to be fairly nimble in the latter case as you pass over the in-between icons, but there is a short delay before the selection lights up. For those ingrained by years of Windows 3.x and 95, it's all too easy to open a program or file by mistake or even run a batch file that may have unwanted consequences.

Despite Microsoft's legal troubles, the determination that IE4 should somehow be the centre of the Windows universe seems to have turned into an obsession. This is a mistake. Companies with a permanent internet connection probably don't want their employees on a permanent surfing holiday. Home and small-business users using dial-up networking will probably find it at best inappropriate (why would I

PCW Details

Price TBA. Availability second quarter 1998

Contact Microsoft 0345 002000
www.microsoft.com

Good Points Many small annoyances have been put right, there's a lot more configurability, and greater emphasis on maintenance.

Bad Points Many "new" features are already available as add-ons to Windows 95, and the Active Desktop can be bewildering and obtrusive.

Conclusion Rather like the Budget: you can like it or lump it, but it won't go away.

★★★

Hardware

Compaq Armada 7792

They don't make 'em like that any more. Or do they? This notebook is a warship of a machine.

Compaq has built its reputation for notebooks on machines aimed fairly and squarely at the corporate market. It does have a range of Presario notebooks aimed at the home and small-office user, but these are as nothing to the mighty Armada notebooks. As the name suggests, the Armada 7792 is a great warship of a machine. It is a desktop replacement notebook: one which maybe travels from one office to another and occasionally takes a trip to another building, but which is not meant to be carried around constantly.

The Armada 7792 has the highest spec of all Compaq's current notebooks. It contains Intel's fastest mobile processor, a Pentium 266MMX, although Intel will be releasing PIII mobile chips in the summer. It has 32Mb of RAM as standard, upgradable to 144Mb, a 5Gb DMA hard disk divided into three partitions and a 13.3in XGA screen. The Chips & Technologies graphics chip is backed up by 2Mb EDO VRAM. There are, as you might expect, two Type II or one Type III PC Card slots, serial, PS/2 and parallel ports and an IrDA port. Compaq has held off from adding USB ports, perhaps quite rightly saying there are too few peripherals for this standard at the moment to justify it. It plans to wait and see what happens with USB and FireWire. However, if USB does prove to be the next big thing, in a year's time you may well be stuck with a machine you can't connect to any of your other peripherals.

The 7792 is a large beast and weighs in at a whopping 8lbs with all the options. The layout does not appear to make sense for a touch-typist as there is no wrist-rest. The mouse is a mousepoint, a stick in the middle of the keyboard, and the buttons are on the very edge of the machine. This does not make it the most comfortable of arrangements, especially given the tendency of the mousepoint to drift around slightly when you have finished pushing it into position.

Instead of a wrist-rest Compaq has filled the space with a plethora of buttons, including four



programmable buttons to launch any file or application you choose, power and sleep buttons and a volume control knob.

Despite the size of the notebook, the floppy drive and CD drive are still modular and you cannot have both of them in at the same time. There are dual drives available which fit both a floppy and a CD drive into one bay, but Compaq has not opted to use these. As Windows 95 does not support hot-swapping of modular drives, having to constantly change drives can be a real pain in the neck. If, for example, you have a disaster and have to reinstall Windows, you can start the process off using a boot disk but will have to shut down before you can install Windows from a CD. On which point, Compaq did not include either a boot disk or a copy of Windows 95 in the box. The essential drives for such things as the graphics and CD-ROM drive are stored on the hard disk, which is all fine and dandy unless your hard drive blows up.

Swapping drives in and out all the time is less than ideal, both in terms of wear-and-tear and in that the connections are never going to be as good as with a fixed drive. We had problems with the floppy drive which had difficulty reading a floppy that was fine in other machines.

Compaq has not included a lot of software in the box. Windows 95 and NT 4.0 are loaded and you then have to opt for one or the other the first time you boot up. However, neither operating system is provided on disk. Nor do you get any major applications. In compensation Compaq has included a number of utilities, mostly aimed at better management of the machine.

Compaq's extension of the DMI standard, Intelligent Manageability, is included, as are ethernet drivers and a diagnostics utility which looks at your machine and compiles a list of what you have in the machine, rather than being intended as a replacement to a package like Norton Utilities or FirstAid. There are also a few utilities aimed at helping the novice notebook user get the most out of their Armada, such as a reference guide and a safety and comfort ergonomics guide.

Overall, the Armada 7792 handles like a bit of a bruiser, heavy both in weight and in performance. Elegant and streamlined are not words that immediately spring to mind, as it is cumbersome to use. It may have the fastest chip available, a large hard disk and a good-size screen, but there is more to a good notebook than this alone.

Adele Dyer

PCW Details

Price £4,933.83 (£4,199 ex VAT)

Contact Compaq 0845 2704000
www.compaq.com

System Reviewed P266MMX, 32Mb RAM, 5Gb HD, 13.3in screen

Good Points Well specced.

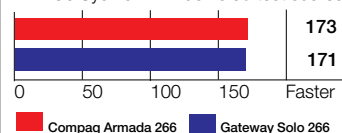
Bad Points Some users could find the design unfriendly.

Conclusion A solid, if unimaginative, notebook.

★★★

Performance results

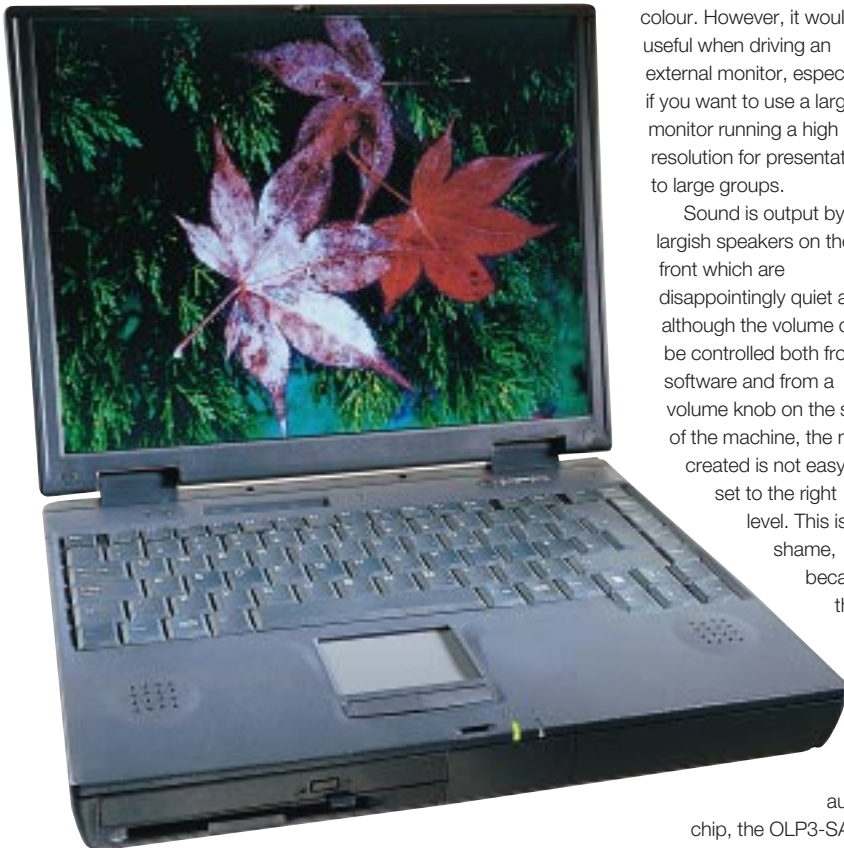
BAPCo Sysmark Windows 95 test scores



■ Hardware

Gateway Solo 9100 266

Always fast off the blocks, Gateway doesn't need reminding that a new chip is on the way.



colour. However, it would be useful when driving an external monitor, especially if you want to use a large monitor running a high resolution for presentations to large groups.

Sound is output by two largish speakers on the front which are disappointingly quiet and, although the volume can be controlled both from software and from a volume knob on the side of the machine, the noise created is not easy to set to the right level. This is a shame, because the

whatever application the user is allowed to use, so the vendors can get away with nothing more than pre-loading the operating system and providing a few DMI utilities.

Gateway, however, does not make these assumptions and recognises that many of its customers do not have these resources at their disposal. As a result, it has included an impressive bundle of software — MS Office 97 SBE, LapLink 7.5, McAfee ViruScan, Encarta 97 and Money 97. LapLink is an especially useful addition, although the cables have not been included, so you will need to buy these.

There is also a full selection of boot disks, and a rescue disc on CD and floppy. Many notebooks vendors do not include these, but they are invaluable to the single user who does not have corporate backup. As the CD and floppy occupy the same drive bay there is no problem about swapping drives when reloading. One piece of software we were a little dubious about was IE 4, which was pre-loaded and on disk with the Active Desktop set as default. We removed it, mainly because it might have interfered with our tests.

Overall, the Solo is easy to use and easy to manage. It wants for nothing either in hardware or software requirements. It is also considerably cheaper than other notebooks on the market with a similar spec. But before you rush out to buy it, you should perhaps consider whether the 266MHz processor is right for you. It is not a great deal faster than the P233MMX, and it may be worth holding off your decision for a few months until Intel produces its Deschutes mobile processors.

Adele Dyer

Gateway has put a lot of effort into improving its notebook market, no doubt spurred on by the success Dell has had with its range. Back in the November 1997 issue of *PCW* Gateway was among the first manufacturers to be ready with a Tillamook-based 233MHz notebook, and this model with the newly released 266MMX is essentially the same model as we saw then but with a few extras.

The Solo 9100 is one of the first notebooks we have seen to incorporate Intel's latest and fastest processor, the Pentium 266MMX. But be aware that this is only Intel's best offering for the next few months. In the summer it will be releasing a mobile version of the PII Deschutes processor running at 300MHz, which should be much faster, although there are still concerns about the power consumption and heat which may potentially be generated by this processor.

The hardware spec makes satisfying reading. The screen has increased in this model to a huge 14.1in and the one we saw was a good-quality display. To back this up Gateway has a Chips & Technologies 65554 video controller and 4Mb of VRAM, much higher than other manufacturers fit in their notebooks. Whether you need 4Mb of VRAM is open to question and certainly you will not need more than 2Mb to drive this screen at its maximum resolution of 1024 x 768 in 16-bit

audio chip, the OLP3-SAX from Yamaha, is one of the better audio components available for notebooks.

Gateway has not skimped on this machine on other fronts. There is a 33.6Kbps Telepath modem, essentially a rebadge of TDK's excellent Global Class modem. This uses software to recognise in which country the modem is being used and will adapt accordingly, so you do not have to manually alter the software configuration to get the modem to operate correctly and legally. The modem is PC Card, which can be tricky to set up but we had no problems getting it to work. You can swap an external modem for one that complies to a faster standard, as and when you consider it necessary.

The other ports are more or less standard: serial, PS/2, parallel, VGA and IrDA. The two Type II PC Card slots support the CardBus standard and Gateway has decided (unusually) to include two USB ports. While some may argue that there is no point in having USB as yet, it is included in the upcoming Windows 98 and you might as well have it just in case. No-one knows the future of USB but it is probably better to be safe than sorry. If it does not take off, the ports are not going to prove an inconvenience; if it does, then you are prepared.

Many notebook manufacturers assume they are selling into a corporate environment where the IT departments will load the notebook with

PCW Details

Price £3,876.32 (£3,299 ex VAT)

Contact 0800 552000 www.gw2k.co.uk

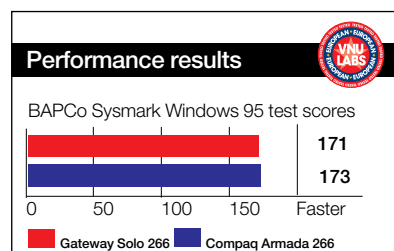
System Reviewed P266MMX, 48Mb RAM, 5Gb HD, 14.1in screen

Good Points Great hardware and software bundle.

Bad Points Disappointing performance results.

Conclusion A good notebook, but think about holding off until the summer before buying.

★★★★



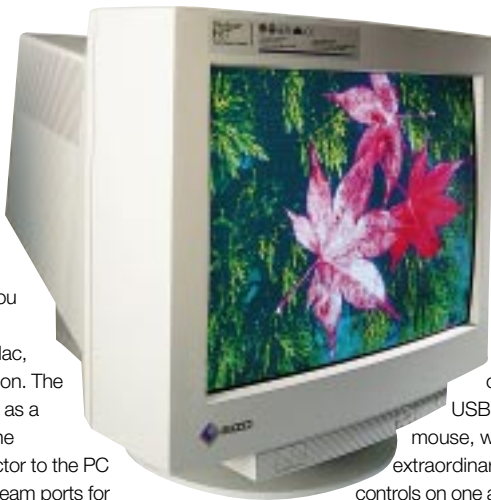
Hardware

Eizo F67

What you see is what you get with this high-quality 19in monitor. USB is required, though.

Nineteen-inch monitors are being produced by many different manufacturers. Most use Hitachi's tube, as does the Eizo, so it has the same basic spec as the Hitachi CM751ET — a shadow mask, FST tube with a maximum resolution of 1600 x 1200 at 75Hz, a horizontal scanning frequency of 30 - 95KHz and a dot pitch of 0.26mm.

The F67 has a few extra features. Its functionality is controlled by a 16-bit DSP and it has both 15-pin D-SUB and BNC connectors, so you can connect any combination of Mac, PC and workstation. The monitor also acts as a USB hub, with one upstream connector to the PC and four downstream ports for



peripherals. One of these is on the front of the monitor and drops down from the side fascia. There are issues arising from putting USB on a monitor (see *this month's monitors group test*, p192) but Eizo has worked around these by retaining the power supplied to the USB while simultaneously allowing the tube to power down into sleep mode, and by shielding the USB connection at the front.

There are three buttons on the fascia: one to control the normal functions such as brightness and contrast, and the size of the display; one to choose the input; and an auto-size button which centres the image on your screen when you have changed resolutions. You can also control the monitor through USB using your keyboard and mouse, which lets Eizo add a few extraordinary extras such as adjusting controls on one aspect of the screen, like

barrelling on one side, by dragging your mouse. A feature called sub-contrast gives you 20 percent more contrast. If you don't have USB, you get the same effect by buying the software and a serial cable, which connects to your monitor via the maintenance port for £29 (ex VAT).

The quality of the F67 is extremely high. Although, as you might expect, the maximum resolution of 1600 x 1200 at 75Hz is a struggle, but at 1280 x 1024 at 85Hz the screen is stable and sharp with an outstanding image. It is clear, with vibrant colours, and we could scarcely detect any convergence, moiré or bleed.

Adele Dyer

PCW Details

Price £880.08 (£749 ex VAT; list)

Contact PDS 01483 719500 www.eizo.com

Good Points Versatile. Good drivers.

Bad Points To make use of all features, you need to have USB or pay extra for cables and software.

Conclusion One of the more expensive 19in monitors, but good nonetheless.

★★★★

QMS OfficeLaser 6PCF

Colour, colour everywhere, in this budget-priced multi-function device. A bargain deal.

Many multi-function devices (MFDs) use inkjet technology so that with the combination of a colour printer and a built-in scanner, they can offer colour copying. However, if you intend to share the device between more than a couple of users, even if you are only using it as a fax, you will have to opt for a laser version if you do not want it to groan under the weight of use. The QMS OfficeLaser 6PCF, as the name suggests, has a laser print engine and prints at a speed of six pages per minute at either 600 x 600dpi or 300 x 300dpi.

The printer uses the same engine as in the QMS' OfficeLaser 600. The quality of this printer is quite adequate for use as a general office printer or fax machine, although it is not as good as some of the other standalone laser printers we have seen. The TWAIN-compliant scanner will scan at resolutions from 100 x 100dpi to 400 x 400dpi, although the

copier function is fixed at 200 x 200dpi.

The MFD can be networked, although there is no space to add a network card. If the machine is connected to a PC, you can fax to and from your PC by altering the settings on the MFD. There is no software included in the box, as QMS argues that most users would prefer to choose their own, although Microsoft Fax should handle most fax instructions. The instruction

manual concentrates on faxing manually and has to be read carefully to discover what you need to do. It supports broadcast faxing and can handle up to 50 numbers at a time, although for this you really need to do it from your PC for the

sake of your sanity. Otherwise, the fax is reasonably easy to use.

There is no handset on the machine, and the telephone socket has been blocked off and cannot be used in the UK, but at the end of the phone line there is a splitter which will let you connect a phone or answerphone. There is no on/off switch, which is not a problem if you need the OfficeLaser on constantly to receive faxes, but it's more irksome if you use it more for scanning, printing and copying.

Adele Dyer



PCW Details

Price £757.88 (£645 ex VAT)

Contact QMS 01784 442255 www.qms.nl

Good Points Considerably cheaper than other laser MFDs.

Bad Points No handset, cannot connect a telephone. Does not support faxing from a PC.

Conclusion A bargain, if you are prepared to sacrifice a little functionality.

★★★

Hardware

Lexmark Optra SC 1275n

This laser is of top-notch quality but if you're trying to cut costs, you might look elsewhere.

The new Optra SC 1275 is Lexmark's second-generation colour laser printer and supersedes last year's considerably larger and dearer Optra C. As before, there are two versions, the SC 1275 with 16Mb of RAM and the network-ready SC 1275n, with 32Mb of RAM and a 10Base-T/100Base-TX Ethernet adapter, priced at £3,760 and £4,150 (ex VAT) respectively.

The SC 1275's specification reads like the Optra C. It is based on an OEM print engine: the C engine was from Canon, the SC is from Minolta. Standard emulation modes include Postscript Level 2, PCL 5 with colour extensions and PCL 6 for monochrome printing. In common with most other colour laser printers on the market, the Optra SC 1275n is rated at 3ppm when printing colour at 600dpi, although this can be extended to 1,200dpi quality via the printer driver. In monochrome mode, the printer can produce a more respectable 12ppm using the 250-sheet feeder which comes as standard. Another 150 sheets can be placed on the multi-function paper feeder.

The price of the printer makes it almost imperative that the printer be shared on a network and Lexmark ships the Optra SC with Markvision network management tool, perhaps the best network printer management utility currently available. But it also integrates in to other network management packages such as HP's Openview and IBM's Netfinity range. Driver support is good with drivers supplied for Windows 3.1x, Windows 95, Windows NT 4.0, OS/2 Warp, MacOS and UNIX operating systems. The Markvision printer management utility starts by discovering each Lexmark printer on the network and reading its status. Once the utility has done this, which only takes a few seconds, you can read the current status of nearly anything of significance involving the printer. It lets you control a comprehensive array of modes, resolutions, and settings from a series of menus. It also lets you track print jobs and



usage directly from the PC. It provides a view of the printer's operator panel on a user's screen, so printer parameters can be set the same way there as at the printer.

For most jobs, you can leave the Optra SC set to its defaults, but making an adjustment takes just a few mouse clicks. I installed it on my mixed network of WinNT 4.0 and Win95 machines and used it for several weeks sans issue.

One of the key features of the printer is the ease of setting up. Some colour lasers (and I'm thinking of the HP Color LaserJet 5 here) can be pigs to set up but this isn't true of the SC 1275n. It uses four small toner cartridges, which simply slide into a colour-coded carousel.

Printing costs are reasonable: monochrome pages work out at about 1.3p per page while full-colour pages at the same five percent coverage will cost approximately 3.7p. The mono cartridge is good for 4,500 pages, and the colour cartridge 3,500. A full set of four toner cartridges costs £158.25 while the 20,000-page conductor unit

costs a further £72.40.

Output print quality was of a high order, but not quite as impressive as the output from the Optra C. Registration was solid, producing sharp lines, solid colours, and clean black type.

Colours were well saturated and even, with little evidence of banding on fills and transitions. Lexmark's simulated 1,200dpi mode gives the Optra SC the edge over some competing laser printers for complex graphics and photos. While the Optra SC 1275n will never compete with high-end dye-sublimation graphics printers, it is capable of producing high-quality colour reproductions for business graphics. For very demanding assignments, this printer can be equipped with a hard disk for buffering, as well as more memory.

Lexmark has got the mix just about right with the Optra SC 1275n. It's well specified, has excellent software support and delivers fine output quality. Designed for workgroup users who need colour and PostScript capability, the Optra SC is a cost-effective business colour printing solution. Nevertheless, in the marketplace it faces stiff price competition from the likes of Minolta and QMS.

Roger Gann

PCW Details

Price £4,876.25 (£4,150 ex VAT)

Contact Lexmark International 01628 481500
www.lexmark.com

Good Points Easy to install, use and manage; good quality output.

Bad Points Cheaper colour lasers undercut it.

Conclusion With a high specification, good drivers, and fine output quality, it hits its mark and provides good but not great value.

★★★

Hardware

Canon BJC-4650



Blue for you: an A3 inkjet for the home or office system, and "Photo-Realism" too.

The Canon BJC-4650 is a versatile printer. Its single replaceable print head holds two refills — a black and a CMY cartridge — to save on wasted ink, but it also takes a range of four different cartridge types and you can even add a scanning head to this. Its ability to handle A3 paper at no extra cost makes it a great choice for those who need large format reproduction on a budget. This model comes complete with a disk of TrueType fonts, a case for holding ink cartridges when not in use and a twelve month return-to-base warranty. Setup was simplicity itself with the CD-based installation routine. Text-based draft output was disappointing: it was grey with jagged edges, but at least like all other output from this printer it boasted water resistance. Standard quality, producing a page in just 34 seconds, demonstrated only slight feathering of very small characters. We felt that although there was a noticeable difference between this and the fine, dense black output of the high-quality setting, it was of sufficient standard to make it not worth waiting the extra three minutes per page.



Our standard oversized Excel worksheet, which arrived in just under six minutes, reduced well to fit on a single A4 sheet while keeping high-quality characters at the standard setting on photocopy paper. The same could not be said for the Corel graphics test. Solid blocks of colour were banded and although the 4650 coped well with the inverse hairline, areas of black were slightly grey. Printing in high quality on bubblejet paper paid off. At seven minutes 41

seconds per page the solid blocks of colour were pure but there was still evidence of stepping on gradated tones.

This printer is a member of Canon's "Photo Realism" range so we were hoping for something spectacular from our photographic image from Paintshop. Using the standard cartridge, the full-page photo took just 11 minutes to arrive on our desktop. On Canon's bubble jet paper there was also hardly any bleed through.

Nik Rawlinson

PCW Details

Price £327.83 (£279 ex VAT) or £386.58 (£329 ex VAT) including scanning cartridge

Contact Canon 0121 680 8062
www.canon.co.uk

Good Points A3 waterproof photo output on a budget.

Bad Points Text-based draft output disappointing.

Conclusion An excellent addition to any home-office system.

★★★★★

CL Graphics Blaster Extreme

Will this graphics card from Creative Labs be the double X-rated success its name suggests?

This is likely to attract buyers looking for an alternative to a cheap add-in 3D graphics card. This could include system integrators, and corporate buyers for whom 3D capability isn't worth paying a premium for. The Graphics Blaster Extreme is based on a Permedia2 graphics adapter, has 4Mb of 100MHz SGRAM fixed onboard and a 230MHz RAMDAC. It supports OpenGL for both Windows 95 and NT, as well as Direct3D and HEIDI so there shouldn't be any problems playing your favourite games. Bundled software includes Creative BlasterControl and Creative Inspire.

However, while the Graphics Blaster Extreme did well on 2D graphics, the 3D performance of this card wasn't brilliant. We tested the card on a PC with 48Mb RAM, using an AMD K6 200MHz CPU. Installation went smoothly enough, the card

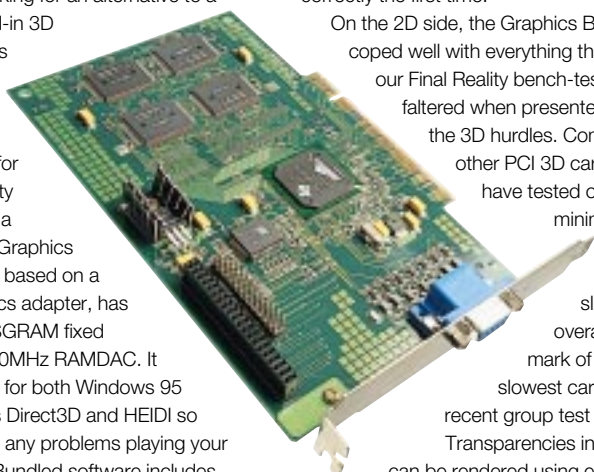
fits into a PCI slot, with everything working correctly the first time.

On the 2D side, the Graphics Blaster Extreme coped well with everything thrown at it by our Final Reality bench-test. However, it faltered when presented with some of the 3D hurdles. Compared to other PCI 3D cards that we have tested on the base minimum of a 166MHz system, it is slow, with an overall 3D reality mark of 1.60. The slowest card in our most recent group test scored 1.62.

Transparencies in 3D graphics can be rendered using either alpha blending, or alpha stipling. Whilst this card uses the more common alpha blending standard, it still failed to reproduce any of the transparency effects or fog in texture-intensive city scenes. All 3D graphics options are available on this card, except vertex alpha and multiplicative alpha (darken). As far as gameplay

goes, the card scored a frames-per-second rate of 13.89 in Quake, which is comparable to other 3D cards on a similar configuration.

Lynley Oram



PCW Details

Price £99 (£84.26 ex VAT)

Contact Creative Labs 01734 344322
www.cle.creaf.com

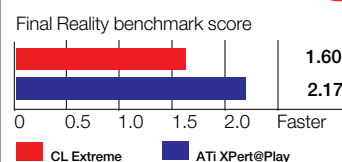
Good Points Price. Ease of use.

Bad Points No transparency.

Conclusion An option for those on a budget.

★★★

Performance results



■ Hardware

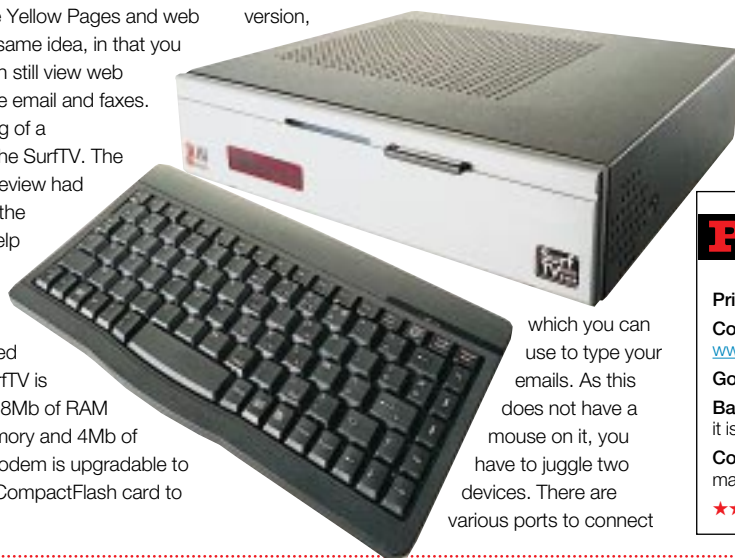
SurfTV

Surf the web without the aid of a PC but you should look before you leap into the water.

ComOne is a French company which last year set up an English arm to market the SurfTV. The French have for some time had the advantage over the English in that France Telecom offers a service called Minitel, which consists of terminals to access information which was a cross between the Yellow Pages and web sites. SurfTV follows the same idea, in that you do not need a PC but can still view web files and send and receive email and faxes.

We were at something of a disadvantage reviewing the SurfTV. The model we were sent for review had no manuals and most of the software, including the help files, was in French. The SurfTV can be viewed using two different devices: a SCART-enabled TV, or a monitor. The SurfTV is powered by a P133 with 8Mb of RAM (4Mb of applications memory and 4Mb of cache). The 33.6Kbps modem is upgradable to 56K and there is a 7Mb CompactFlash card to store pages.

It is controlled by two devices. The first is a remote control with a central button that lets you move the mouse around the screen and buttons to get you back to the main page, to your favourites, to your email and so on. The second was an IR keyboard; we were sent a French version,



which you can use to type your emails. As this does not have a mouse on it, you have to juggle two devices. There are various ports to connect

other devices to the SurfTV, including serial, parallel, PS/2 and S-Video ports. There will be a SurfTV Plus available soon which will include a CD-ROM player or a digital laser video player.

We hit a few problems with the SurfTV. We could not get it to work with the TV we were using and had to use a monitor instead. We also had problems sending email: the emails got through but the process seemed to hang the machine and we were unable to contact ComOne to sort out the problems.

Adele Dyer

PCW Details

Price TBA (est. £300 incl, or £255.32 ex VAT)

Contact ComOne UK 01189 690595;
www.com1.fr/uk/

Good Points Internet without a PC.

Bad Points The trouble we had using it suggests it is not as straightforward as it should be.

Conclusion This is early technology — wait until it matures before you invest.

★★★

CIDCO iPhone

For those net addicts who aren't PC aficionados, this netted phone could be the answer.

The three main problems with the internet (the initial investment you need to get on it, its complexity and the fact that you have to boot up your PC just to get your email) are all addressed by the CIDCO iPhone, a revolutionary, if obvious, new telephone. The iPhone, at £499, is a wonderful solution — almost. It is a great email client and browser for those who use the net in a transactional way, surfing to get information quickly.

It is a normal-looking phone, about a foot wide but it has a greyscale, touch-sensitive, 640 x 480 screen. This screen has six large icons. Touch the internet icon with the (passive) stylus and it will dial up, log on (to proprietary servers) and download the default or chosen page. A keyboard slides out to enter addresses. Another click takes you to the email client, which

connects to any SMTP/POP3 mail server. You can read, reply and send any email (not attachments). It polls, but only at two specific times a day.

The iPhone gets around the need for browser software rather cleverly: all the HTML is rendered on the server, *à la* thin client. This means that you get pages delivered very quickly, despite only having a 14.4Kbps modem. It also means that only the server needs to be upgraded for all users to receive the advantages. Unfortunately, the server is somewhat behind the times. It doesn't support frames, animated GIFs, Java, fonts and only supports some font sizes. And links are displayed as buttons, not underlined words.

The phone itself is well specified but has a couple of annoying features. The keyboard

doesn't slide out easily and the handset sits poorly on its seat: the slightest jog to the iPhone dislodges it, disconnecting you. Caller ID and the built-in call logging system that depends on it do not function either. However, you can enter a directory of 200 phone contacts.

The iPhone is an exciting look at the future of telephony integration. For quickly looking up specific information and for getting your email without the ten minute boot-up time of your average PC, it is a successful first pass.

Paul Smith



PCW Details

Price Expected retail price £499 (£424.68 ex VAT)

Contact MediaScope 01686 624 829
www.cidco.com

Good Points Good integration of phone and net.

Bad Points Poor handset design; limited HTML support.

Conclusion If you use the net a lot, or want to collect email when you don't have a PC, it's a must.

★★★

■ Hardware

Konica Q-M100

Caught on camera: this Konica is compact and capable but lacks the power of zoom.

Mega-pixel digital cameras have been popping up one after the other over the past few months and every camera and film manufacturer under the sun is getting in with its own product. Konica has struck out with a distinctive camera of its own. Eschewing the flash SLR looks of the Olympus C-1400L or the space-age feel of the Agfa ePhoto 1280, the Q-M100 resembles a standard compact camera.

The functionality on the camera is simple. There is one button to select the compression rate and resolution you want: superfine is 1,152 x 768 at low compression, fine is the same resolution at normal compression and economy mode is 640 x 480. On the 4Mb CompactFlash card supplied you can fit ten, 20 and 50 images for the respective settings. There is one button to set the flash, one for the self-timer and another for macro mode. The focal length is fixed at 6mm which is roughly the

equivalent of a 35mm lens on a film camera. There is a 2X digital zoom on the camera, but this effectively drops the resolution down to 640 x 480 as you are simply homing in on part of the image.

There is a viewfinder and an LCD screen, which gives you the flexibility of setting up shots without using up too much battery life, but still lets you review and sort your pictures without downloading them. The menu items on the camera let you do such things as erase images, play them as a slide show, set the screen brightness, date and time of images and format the disk. If you want to get technical, you can set more details of the



camera's functionality, such as exposure, sharpness and white balance, using a utility loaded on your PC and then download these to the camera via the serial link.

The camera uses four AA batteries, (an AC adapter is included as standard). A useful extra is the pin part of the plug, which pulls off and can be replaced by pins to fit almost any socket world wide. PhotoDeluxe 2 is included, plus Mac and PC drivers. There is no version 2 for Mac, as yet, but this will come to buyers as an upgrade.

Adele Dyer

PCW Details

Price £599 (£509.79 ex VAT)

Contact 0181 751 6121; www.konica.com

Good Points Easy to use, good pictures, bundle includes everything you need.

Bad Points No zoom.

Conclusion Not as versatile as the Kodak DC-210 or and Epson PhotoPC 600, but a good camera.

★★★

Augur Viewmate camera

The spy who loved me? Keep an eye on your desk while away, with this multi-faceted camera.

Tired of sending plain text-based emails which your client may or may not take time to read through? Sick of your workmates making off with your stationery when you're not there? Instead you can grab your client's attention by sending a video email and even keep an eye on your desk while you are away from it. The Viewmate PC-camera from Augur lets you do both of these, and handles more conventional applications such as video conferencing.

The camera plugs into your PC's parallel port. It doesn't have a pass-through, which is tricky if your printer normally uses that port. Full-motion video is available at a maximum resolution of 160 x 120 pixels, while still images have a resolution of 640 x 480. Picture quality isn't perfect, and any blocky effects are kept to a minimum. But if you move too quickly, the picture blurs.

The quality of the audio was better than we expected, but our voices still sounded slightly robotic. Using the Viewmate PC-camera for video conferencing is

straightforward if you're talking modem to modem. Despite the promises on the box though, you will need to purchase additional software to use it over a LAN, or Augur will put together a bespoke corporate package.

Sending and playing back video emails is equally simple. You talk to camera and the software creates an executable file which you attach the file to an email and send off. As the file is a self-extracting executable, there shouldn't be any compatibility problems when the recipient comes to play back the video.

Augur has included some handy pieces of

software. Gotcha! enables you to turn the camera into a surveillance and security device based on motion-detection and face recognition. So you can keep an eye on your stuff when you're not there, protect any documents from prying eyes or even play a game while using the camera to keep an eye out for the boss. When movement is detected, the software will automatically minimise any selected applications, and maximise an application of your choice, such as MS Word.

Priced at £149, it isn't the cheapest camera we've come across, but it is competitively priced.

Lynley Oram



PCW Details

Price £175.08 (£149 ex VAT)

Contact Augur 01283 510888

www.viewmate.com

Good Points Video mail, ease of use, security and motion detector.

Bad Points No pass-through on parallel connector.

Conclusion A good camera, more suited to home office/small office use.

★★★

Macromedia FreeHand 8

This vector-drawing program now includes new web features and new arty tools and effects.

Although our sample copy of this vector-drawing application was still in beta, by the time you read this the finished version should have been released on the Mac and PC, with cross-platform file compatibility.

Unlike the Corel Corporation, which crams the box until it's full before putting it on sale, Macromedia's marketing style is a little more circumspect. The base product, Freehand 8, can

FutureSplash. The latter was relaunched as Flash, and integrates with the established Shockwave technology, as well as being playable via Java. Unlike animated gifs, Flash files are vector-based, so have a smaller screen size/file size ratio and hence download faster.

Flash is a vector-drawing program in its own right, with facilities such as Bézier editing, graduated fills, shape and text tools. But there is

one important difference. At the top of the screen is a timeline, and each layer (corresponding to an animated object or the background) shows the relevant frames. You can "onion skin": that is, see more than one frame at once by overlaying them, and you can "tween", or create intermediate

will form a separate frame. The same trick works with text on (or in) a path.

FreeHand does not, however, have a Save As or Export To HTML, which is where Insta.HTML comes in. This is an add-on (or Xtra) that exports FreeHand files into HTML format. You get the option of HTML 3.2 or the more precise DHTML and you can include URLs attached to FreeHand objects and export graphics in gif or Flash format.

Interface issues

So, having dealt with the webby stuff, what's in it for those buying the standalone version or designing just for print?

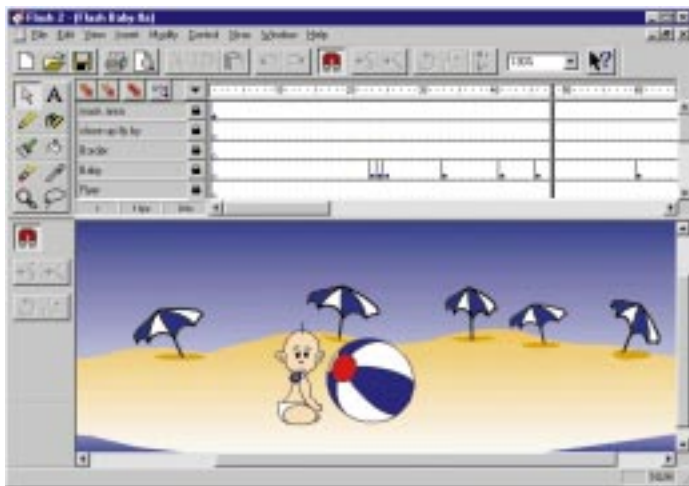
The interface looks much the same, as the great leap forward into button bars, context menus and a recent file list took place with version 7. FreeHand's strongest interface feature are the Inspectors: tabbed panels (which can be separated by dragging) to provide interactive control for the position, size, line, fill and text attributes of the selected object. These have wisely been left unchanged but there have been several other enhancements.

The toolbars and keyboard shortcuts are now customisable, there's more information on the

status line, and you can save custom views of a file. The most productivity-enhancing new interface feature, however, is a Fast Mode in the view menu. This simplifies the display (but not the print or file quality) of fills, blends and imported bitmaps, as well as greeking small text to show as grey bands; the result is that redraws and zooms are faster. This is especially noticeable with files that contain lots of complex blends; we clocked a six-fold difference on a sample file.

Palette management is FreeHand's strong point: start a new drawing and you'll have black and white in the colour

list. You add colours either by mixing in CMYK, RGB or HLS models, or by selecting from a range of Pantone and other libraries. This automatically creates ten tints of the colour and you can add some or all of these to the list. Although this is more longwinded than grabbing colours freely from a large, preset palette, it gives the artist far more control. Not only do they know what colours are being used in a drawing but changing a parent colour in the list will update all instances of that colour and its tints in the drawing.



Above Macromedia Flash: low-bandwidth animation for web pages

Right The new lenses (clockwise from top left): darken, monochrome, invert, transparency and magnify

be bought as a standalone. For another £100, you get the Design in Motion suite, which adds Flash2 and Insta.HTML. The bundling we saw for version 7, which included xRes, Fontographer and Extreme 3D, is not available in this version. Both the standalone and suite packages include 500 fonts and 10,000 clipart images.

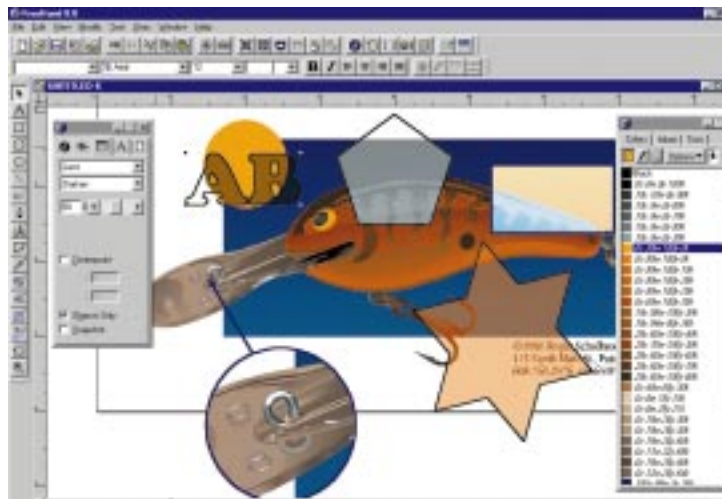
Web features

So what's new? Version 7 saw Macromedia addressing web design by incorporating the facility to create image maps, and zoomable vector images that could be viewed in a web browser with the Shockwave plug-in.

This release goes further down the path, as a survey conducted by Macromedia revealed that 40 percent of its clients were already designing for the web. By a happy coincidence, Macromedia had previously gone shopping and acquired FutureWave and its animation product,

frames from key frames automatically.

Flash can be used on its own, for everything from creating interactive buttons to complex animations but it doesn't have the drawing power of FreeHand. So, you can create key frames in FreeHand, export to Flash format and then either incorporate the file in a web page or run it directly in the Flash player. What makes simple animation effects even easier is that in FreeHand you can create a blend from two or more objects to create intermediate ones, then Release to Layers: when you export the file to Flash, each step of the blend



There has been a minor, but very welcome improvement here in that you can right-click a mixed colour and Add to List rather than drag and-drop it, where it was all too easy to accidentally overwrite an existing colour. Corollary to this, the mixer and colour list palettes can now be stacked together.

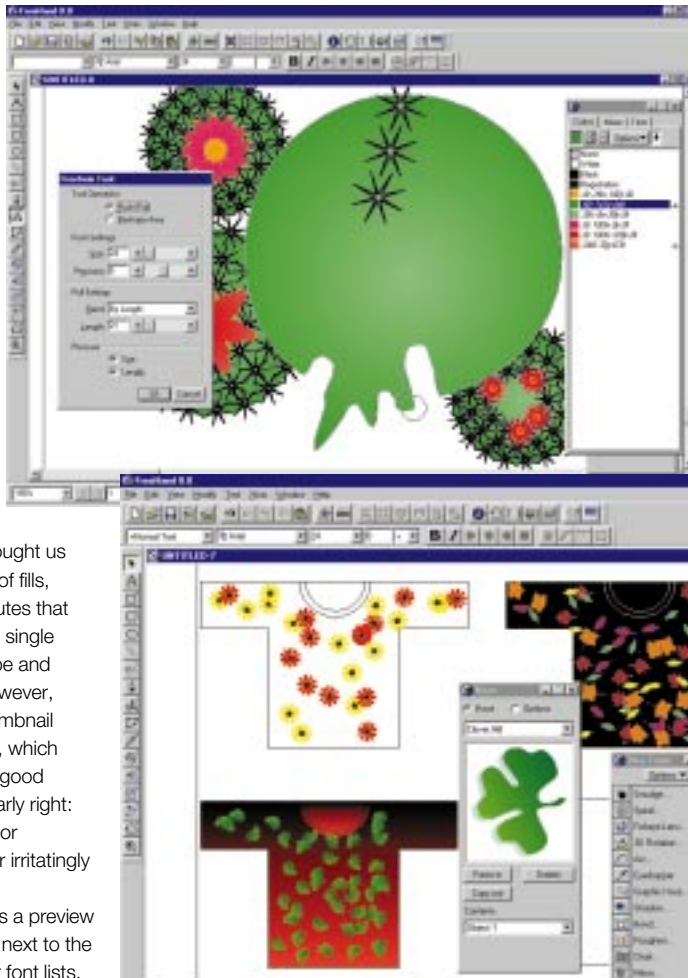
Version 7 also brought us styles; combinations of fills, stroke and text attributes that can be applied with a single click. Unlike the Adobe and Corel equivalents, however, these didn't have thumbnail previews, just names, which meant you needed a good memory. Now it's nearly right: you can have names or thumbnails, but rather irritatingly not both at once. Complementing this is a preview panel which pops up next to the Inspector and toolbar font lists, which will be welcomed by those who have many typefaces but no photographic memory.

New features

Let's start with lenses. Both shapes and text can be given a Lens fill from the Object Inspector. Having done this there are many sub-choices. Lenses can be used to magnify, lighten, darken, invert colours or reduce to monochrome whatever lies beneath them.

A Transparency lens is just that: the fill becomes transparent and can be adjusted interactively between zero (invisible) to 100 percent (opaque). There's an Objects only option for lens effects, so that the background is not affected: the lens is effectively cropped to the objects upon which it is acting. Another useful feature is that the centre point or focus of a lens can be offset, which means you can create a lens beside a drawing, say, that magnifies a detail without obscuring it.

Freehand has always had excellent and precise drawing tools but this version brings a welcome touch of less rigidity and more intuition with the Freeform tool. Draw an ordinary shape (a rectangle or ellipse, say), then pick up the Freeform tool. You'll find you can push and pull the outline around as if it were made of putty. This is not just acting on existing control points, like the shaping tool, but actually creates new points on the fly, as needed. As with many of



Left Push-me, pull-you — intuitive shaping complements Bézier editing

Below Spray it with flowers, leaves, shapes or whatever you want.

item appear on the relevant menu (e.g. Export again) which repeats the last action with the same options but on new objects. File Import/Export is well up to date, with the facility to import the latest versions of rival products, but we found Corel 8 import unreliable in the beta version.

Those preparing work for outside printing will appreciate the Collect for Output feature which collates all the resources, including fonts, linked images and print settings, for delivery to an image-setting bureau. FreeHand supports the DCS 2 standard which splits output into five files: a low-res preview and four high-res CMYK separations.

Conclusion

Although there's much that's new to FreeHand, little of this is new to the industry. Corel had lenses in 1994 and has had interactive transform handles far longer. The UK-developed Xara pioneered transparency in 1995, and Corel, having acquired the Xara distribution rights, followed suit the following year in its own product. Both make a far better job of it than FreeHand as they offer graduated transparency with interactive controls, giving a far more natural effect to things such as

shadows or liquids. FreeHand's fill options are still spartan compared to Corel's; there are fewer gradation options and none of the fractal-generated textures.

The interface still has a way to go. The Xtras are poorly organised and, despite the customisable toolbars, there seems to be no way to get tools like the Graphic Hose in with the main tools. Conversely, while the Graphic Hose has a modeless dialog to let you change settings as you work, everything grinds to a halt if you open, say, the tool settings for the Freeform or Polygon tools; you can't continue drawing, or do anything else until the dialog is closed.

Tim Nott

FreeHand's tools, you have to double-click on the tool button to change the settings (Macromedia has yet to discover the modeless tool settings bar) but if you hold down the arrow keys while pushing or pulling, the tool size changes. Also new in this release are interactive transform handles: at last you can resize, move and rotate objects without having to select different tools, just by double-clicking with the arrow tool active.

The idea of a Graphic Hose to spray a drawing with a variety of small, semi-randomised images isn't new but this is the first time I've seen it in a drawing, rather than a painting program. The idea is that you can create a pattern by spraying a pre-defined set of objects onto the page. You can customise the spacing, sequence, size and rotation to suit. There are preset emboss, chisel and shadow effects (presumably with web-button design in mind) and a new mirror Xtra which produces rectangular or radial arrays of an object.

Productivity

Moving on to productivity, we've already seen how the fast preview mode speeds up redrawing and zooming. Macromedia claims an all-round increase in performance (but then it would), particularly in the manipulation of imported bitmaps. One great time-saver is the "again" feature. Having carried out a command like Release to Layers or Export, you'll see an extra

PCW Details

Price FreeHand 8: estimated street price £327.83 (£279 ex VAT). Design in Motion Suite: estimated street price £445.33 (£379 ex VAT). Various upgrade and cross-grades available.

Contact Macromedia 01344 458600
www.macromedia.com

System Requirements PC, Win95, NT4, Mac.

Good Points Web features in the suite. New creative tools and effects in the standalone product.

Bad Points Interface still messy. Many of the new features lag behind the competition.

Conclusion A follower, rather than a leader, but a quality product nonetheless.

★★★

Software



GoldMine 4.0

GoldMine now has extra lustre with new enhancements and some useful additional features.

GoldMine is extremely powerful and will satisfy almost anything you could demand of an out-of-the-box program. It is feature rich, yet manages to maintain ease of use. A major plus is that it is customisable and can be adapted to suit the needs of many departments — even large businesses can standardise their contacts databases. It benefits from the excellent resources of AVG Sales and Marketing, which distributes GoldMine in the UK and undertakes everything from installation, through technical support to staff training.

A contacts manager is essentially a glorified address book. It maintains a database of company and contact names, addresses and telephone numbers, but in addition will store other information about contacts, prospective clients and current customers.

A contacts manager differs from its close sibling, the Personal Information Manager (PIM) because essentially a PIM is designed to keep track of your appointments, to-do lists, and other activities, while a contacts manager is designed to keep track of your contact's interaction with you. It can record a history of your personal or your company's dealings with each contact. You can note detailed information about prior sales, phone calls, shipments... in fact, everything and anything you want, because GoldMine allows you to attach free-form notes.

It is difficult, with a product already as feature-rich as this, to produce a truly knock-your-socks-off upgrade and there is little in this new version to take your breath away. Primarily, the enhancements in version 4.0 are in the areas of improved performance and ease of use. These include background processes and automated processes, which make Goldmine quicker to use. There is improved help, a couple of new features like the E-mail Centre and the opportunity management module. Nothing tremendously earth-shattering but enhancements which existing users will welcome and which may tip the scales in its favour for prospective users.

The new Opportunity Management module is essentially an integrated projects manager. It is designed to address the requirements of complex sales environments and enables you to get a complete overview of every sales activity, from prospect to close. It is also a tool which enables you to gather intelligence about the process of making the sale and revealing how the approach might be streamlined and made more efficient. But more than this, you can use this feature to track any project; single or multiple.

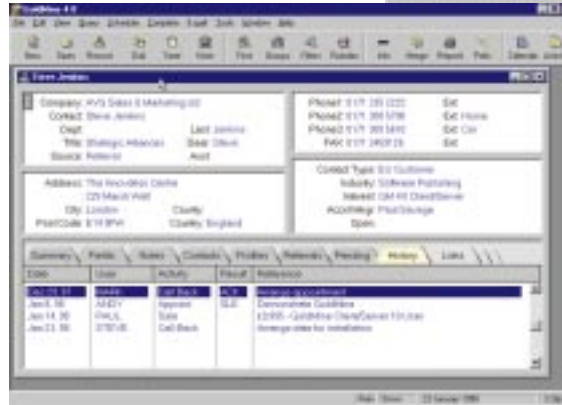
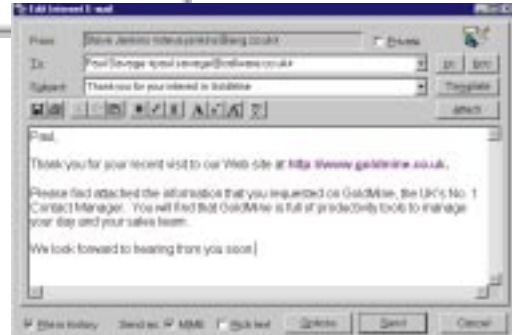
Goldmine 4 includes a new territory alignment wizard to assist sales managers and systems administrators with the continuous maintenance



Above The Opportunity Management module gives you complete control over complex sales environments

Right The new email centre handles all your email from a central location — even multiple accounts

Below The Contact Management database is relatively easy to use



of account ownership and territory assignments. The latter are then automatically synchronised to the field and any distributed offices.

At present, the E-mail Centre, is the only contact manager to offer true POP3 messaging and support for Microsoft Exchange 5.0. It will handle your email across multiple accounts and any special delivery and retrieval requirements, so you can use GoldMine for sending, receiving and performing any maintenance on your email communications. The Centre is a familiar folder-driven design and won't surprise anyone who uses services like MSN or Virgin.net.

GoldMine has been speeded up in several ways, most notably through the implementation of true 32-bit Windows threading. This enables you to perform multiple tasks simultaneously. For instance, you could have GoldMine perform a mail merge at the same time as you check for

incoming email, and export some files. This background processing applies to automated processes, global replace/delete, synchronisation, mail merge, reports, email, group building, and importing and exporting data.

The automated processes mentioned above have also been increased with many new

enhancements. Automated processes are tasks which you can set GoldMine to perform without your intervention, thereby improving productivity.

The help system has been improved too. There is an interactive, online tutorial, improved context-sensitive online help, and a revised set of manuals. Add to all this the versions of GoldMine Client/Server for SQL and dBase IV and full integration with the new Microsoft BackOffice Small

Business Server and GoldMine is certainly maintaining a lead over its main rivals.

Paul Begg

PCW Details

Price Single user £229.13 (£195.00 ex VAT); five-user £699.13 (£595.00 ex VAT)

Contact AVG Sales and Marketing 0171 335 2222; www.avg.co.uk

System Requirements Windows 95 or NT 4.0.

Good Points Highly customisable. Excellent support.

Bad Points GoldMine 4.0 databases are not backwards-compatible.

Conclusion You probably can't do better than GoldMine.

★★★★★

Software

Sage Instant Accounting 98

For SMEs. Simple Sage could be a wise buy for the first-time user — it's year 2000-proof, too.

Small and medium enterprises (SMEs), are big business in the UK. The DTI estimates that SMEs are responsible for 65 percent of turnover and 66 percent of employment in the EU. There have been relatively few products specifically geared towards the SME sector in the past, but manufacturers are beginning to realise

was headache-free and only took about five minutes. The Easy Startup wizard has also been improved to make it simpler to set up accounts for new and upgrading users. Divided into three areas based on the core ledgers (sales, purchase and nominal) the wizard allows you to easily skip any area that might not be applicable to your

business. And you don't have to fill in everything at once if you're unsure of certain information.

Having entered information such as your company's VAT and financial year details, and defaults for your customer and supplier accounts

gives you a pull-down calendar or calculator. Mouse usability and keyboard shortcuts have also been improved to give you quicker access to records or options. If you get stuck at any point, there are a number of wizards available that can help you create a new account, transfer money from one account to another, or even carry out tasks at year end. The online help facility is comprehensive and gives you information on both the program and accounting procedures.

New reports have been added to Instant Accounting 98 to help you identify valuable customers and suppliers. Simply click on the report icon, and the information is collated. You can set criteria to filter out unwanted data for reports and certain tasks, as well, such as excluding customer accounts with zero balances from being sent statements, or targeting customers in a certain area with a letter campaign, for instance. You are also allowed, for the first time, to place accounts on hold if someone goes over their credit limit or becomes

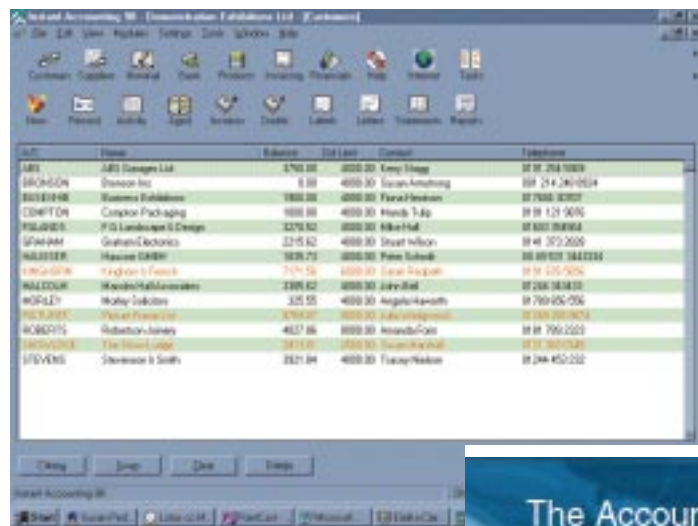
obstinate about paying on time.

Instant Accounting 98 has been declared "Year 2000 compliant", which means you shouldn't have to worry about your data going haywire or having to buy a new product in two year's time. Nevertheless, Sage's product line is designed to grow along with your business, making it simple enough to upgrade if you need to.

Users who sign up to the SageCover service are entitled to regular upgrades, as well as technical support and

discounts on stationery, making this a good choice for the first-time and long-time user alike.

Susan Pedersen



Above The Instant Tour introduces you to the software and bookkeeping procedures at the same time, using clear examples

Right It's not too flashy but it gets the job done. The clear toolbar and uncluttered menus make the job easy

that they are a potentially huge source of revenue.

Sage, the accounting and payroll software company, has long specialised in the SME market. Its products have a good reputation and Instant Accounting 98 is no different. It may not be flashy but it gets the job done with little fuss.

You don't need a whiz-bang machine, as it will run on a 486, and because it's geared towards the first-time buyer, it doesn't require accounting experience. A short guide to bookkeeping is included and the online guide outlines basic PC accounting principles giving clear, easily understandable examples.

There is also a set of demonstration company data which newcomers can try, and charts of accounts for the most common businesses are also supplied. These kinds of features are vital as many new users may never previously have encountered PC accounting software. Sage should be praised for its new Instant Tour, which includes the bookkeeping guide and also gives users a thorough overview of the software and a rundown of new features. Installing the software



(how long they have got to pay an invoice and their credit limit), you're ready to begin. The toolbar gives you ten options, ranging from customer, product and supplier details to the nominal ledger, invoicing and bank statements. You can also keep track of all transactions you've entered using the Financial icon. Instant Accounting allows you to look at multiple windows at once (so you can compare your bank statement to your nominal ledger, for instance), and any changes you make in one window are automatically reflected in the others.

Instant Accounting 98 has paid close attention to the important little details. For example, whenever you enter dates or figures into an invoice or purchase order, a button appears and

PCW Details

Price £99 (£84.26 ex VAT)

Contact Sage 0800 447 777 www.sage.co.uk

System Requirements Windows 3.1 or higher.

Good Points Plain and simple. No-fuss interface and procedures.

Bad Points So far it hasn't expanded its internet capabilities much.

Conclusion A great all-rounder for first-time users.

★★★★

Software



Metacreations Bryce 3D

It's pure Zen and the art of creation. A graphics and animation package for virtual landscapes.

A landscape created using Bryce 3D is a bit like a recipe prepared on TV's *Ready, Steady, Cook*; with the simplest ingredients, miracles can be cooked up in minutes. I put together this picture of an island (opposite) in under 15 minutes, of which ten involved nothing other than sitting back and watching the image being rendered on-screen.

Bryce is essentially a tool for creating virtual landscapes, both realistic and fantastic. However, in its third incarnation, it is little short of a fully-fledged 3D graphics and animation package, offering most of the tools you need to create and render scenes of all sorts.

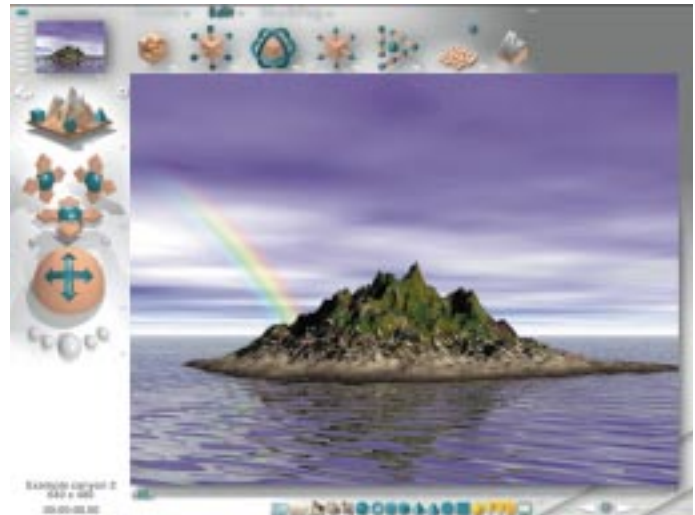
The package has always been an oddity, and it still is. For example, its interface is as bizarre and beautiful as ever: the product of Zen and the art of software maintenance, with buttons and icons that pulse seductively when the mouse pointer strokes them. Yet behind that pretty interface lies a serious 3D graphics engine which, for the first time, boasts some powerful animation tools among a range of improvements.

These work much as they do in other 3D authoring packages, allowing you to fly through landscapes as well as to animate objects within them. Just about any parameter that can be changed can be animated: the shape of objects, their surface textures, the movement of the sun, moon, stars, and so on.

The way in which parameters change over time is managed via the new "Motion Lab" console. It enables quite complex dynamics to be modelled relatively easily, although animation novices will have to read the documentation carefully. However, reflecting the fact that Bryce still isn't a full-blown 3D package, there is no inverse kinematics, which makes it harder to animate complex objects like animals or humans.

The other major feature to be introduced with this new version of Bryce is the facility for creating "volume materials". All 3D packages include tools for adding surface textures or materials to objects: essentially they determine what the objects look like when they are rendered. Bryce has always offered the means to do this in quite sophisticated ways. For instance, you can specify a material which changes according to altitude; ideal for texturing mountains with snow-capped peaks and grassy lowlands. But even these surface materials do not tell you what an object (a cloud, say, or a body of water) looks like from the inside and this is where volume materials come in. Creating a volume material amounts to editing the material's set of special volume "channels".

Right Bryce's interface, with rendered landscape in the main viewport



Below The "Motion Lab" console, used for controlling animations



The channels determine fairly self-explanatory parameters (the density and colour of the material, for instance). But it is hard to predict the results, especially as objects with volume materials render extremely slowly, making experimentation tedious. Thankfully, there is a generous library of presets, which provides excellent material with which to work.

There is also a generous library of new tools for adding nice touches to Bryce scenes — numerous environmental effects which can be added with just few clicks of the mouse button. For instance, there are rainbows which, in an animated scene, appear and disappear according to the position of the sun; star fields, complete with comets, which shine or fade according to the brightness of the moon; rings to simulate the dazzling brightness of a noon sun or a full moon; an horizon illusion, which simulates the sun or moon getting bigger as it sinks.

There are, inevitably, a few problems and niggles with Bryce. Firstly, it is extremely

demanding on your hardware — if you haven't got a fast Pentium- or PowerPC-based system with plenty of memory, forget it. Secondly, you have to learn to put up with its quirks, such as an improved but still fussy method for selecting objects, a tutorial that seems to come apart from the example files which are supposed to accompany it, an unforgiving undo command that will undo your last mistake but none before that, and a materials editor that is complicated to the point of indecipherability. But these are rather endearing eccentricities.

The only doubt is deciding who exactly Bryce is for. It is not quite a competitor to the likes of Ray Dream Studio, Truespace or Extreme 3D yet it does much of what they do and more. If you want to find out why doing 3D graphics is fun as well as functional, look no further.

Benjamin Woolley

PCW Details

Price RRP £210.33 (£179 ex VAT); street price £175.08 (149 ex VAT)

Contact Computers Unlimited 0181 358 5857
www.unlimited.com or www.metacreations.com

System Requirements Win95/NT, Mac 7.1.

Good Points Entertaining; elegant; eccentric; cheap and powerful.

Bad Points Demanding on hardware. A few annoying quirks. Complicated materials editor.

Conclusion About as much fun as you could hope for in such a small box.

★★★★★

Software

Actinic Catalog 2.0



Branches throughout the world? Small businesses can have their own online shopping site.

Overpaid gurus have long held up the internet as being the future of commerce. One of the biggest stumbling blocks on the road to this capitalist nirvana is the basic cost and complexity of providing an online shopping area. This is why the e-commerce revolution has, so far, restricted itself to large corporations, niche online sellers and small companies which happen to be run by techno-wizards.

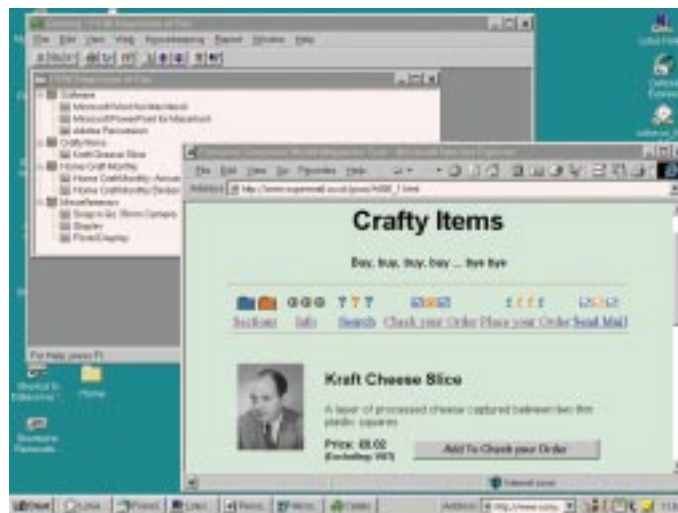
Actinic Catalog is an attempt to address the needs of small businesses which, up until now, have had neither the expertise nor the money to set up a presence on the web. The biggest money-saving aspect, aside from the basic cost of the software, is that you can use Catalog on the web space provided free with dial-up connections from most internet service providers (ISPs). This means that you do not need to buy the expensive dedicated server and leased line combination for permanent connection to the internet, thereby saving a huge amount of money.

You can set up your online shopping site on any web server with Perl 5 and user-writable CGI (don't worry about these technical terms; a simple phone call to your ISP will provide you with the information you need).

Installing and configuring Catalog is not for the faint hearted so it is just as well that Actinic offers telephone handholding for this tricky procedure. If you want to buy a one-stop solution, the company also offers a "web-hosting" version of Catalog, where the web space and configuration are set up for you by Actinic. This simplifies things immensely, to the extent that you can just install the software and set up a basic site within minutes. The down side is the extra cost.

Any web site you create using Catalog alone is structured in essentially the same way. The main web page displays a list of all the different sections you have created. If your shop were to specialise in preserves, you might have sections such as jam, or chutney and pickle. Clicking a section on the web page would then take you to a second list. For example, "jam" might lead to a list of different flavours of jam. Each of these products could have a picture, a description and a price.

Shopping follows the common shopping cart system where you add your desired items to a virtual shopping cart and order them all at end. You can check the shopping cart at any time and



Adding products to your online shop couldn't be easier

company on the site, together with shipping information, remittance terms and a few marketing bits and bobs. These facts are inserted in specific places within the web site (over which you have no control). It would be nice to have a bit more say in the design and feel of

the web site but, on the positive side, I have no complaints about the standard layout.

Of course, the most important thing about an online shopping site is that it lets you buy goods. Catalog allows you to choose between a variety of payment methods including cash on delivery, cheque on invoice, and credit card. You can set up many different kinds of credit cards and request different details for each. The user confirms their order and downloads an ActiveX or Java applet which asks them for their personal and card details which are then scrambled using 128-bit Diffie-Hellman encryption. They are then transmitted over the net to your shopping site.

Credit card information is only decrypted once it has been downloaded to your PC via Catalog, so the likelihood of someone hacking the details is greatly reduced. When an order is made at your site, the user receives confirmation and an email is automatically sent to you. You can then download the order at your leisure, view, print, adjust the order and run a variety of reports on the status of your online business.

Adam Evans



You can choose between payment methods with a few clicks of the mouse

change the contents and quantities at will. This does not allow for a great deal of flexibility in the design and construction of the web page but it does produce a decent, well-structured site with a minimum of effort.

The design is not totally inflexible; all the graphics and backgrounds can be easily changed. If you want to include small pictures of products on your site, though, remember that you will need some method of getting it onto your computer (e.g. a scanner or digital camera).

Catalog has a rather bizarre bug which occurs when you use the browse facility to locate a graphics file. Once you have selected the file, it forgets to include the drive letter in the address, which means that it then cannot find it. Also, it cannot cope with apostrophes in names of directories, even though they are allowed in Win95. These are niggling problems with easy workarounds but they do raise the possibility that Actinic's testing is not as thorough as it might be.

You can include lots of details about your

PCW Details

Price £410.08 (£349 ex VAT) for basic software

Contact Actinic Software 01932 860524
www.actinic.co.uk

System Requirements Windows 95 or NT

Good Points Inexpensive; quick to use.

Bad Points No printed manuals; restricted design.

Conclusion If you want an online shopping site, with the minimum of fuss and expense, this is the package for you.

★★★★

Software

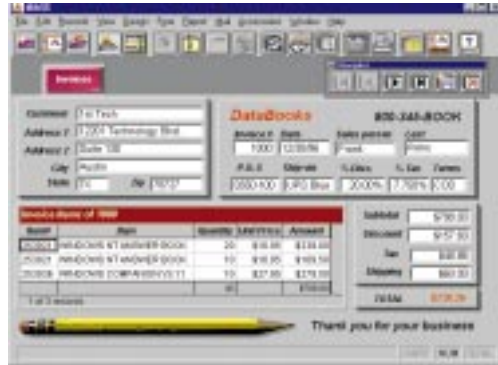
iBase

It's easy to establish relations with this database tool but it's best to keep it on a personal basis.

Everyone needs to manage data, but existing software, according to easyBASE, is either too limiting or too hard to use. Its iBase product aims to provide relational power without the need for programming. And there is genuine innovation in iBase. To create a new database, you begin by designing a form.

If, say, you were creating a library catalogue you might place fields for title, author and publisher. But one author may write several books: select the author field, choose Move to New Database, and iBase creates an author table and converts the field to a lookup type. The underlying work of setting up a relational link is done for you. It is then easy to create a new form to view all the books by a particular author. We did this but had problems when trying to delete an author.

Once you have set up a database, you can integrate it with the document manager and set up links in a variety of formats, including Microsoft Office documents. You can create, view and categorise documents from within iBase. Another approach lets you create database models by



drag-and-drop. The software can then create relational links based on the model diagram. There is also an email module, capable of handling multiple mail accounts. But despite these extras, there are some basic features missing: multi-user databases are not supported, although this is promised for a future version; there is no easy route to mail-merge; and the only currency symbol is dollars.

The auto-link technology in iBase is impressive. The problem is that you may run into

The example invoicing system looks good, but iBase is better used for personal information

a brick wall when you want to do something the designers have not allowed for. Although the supplied example is a database of customers and invoices, we would be wary of running a business on such a limited system. For managing personal information and documents though, iBase might be just the thing.

Tim Anderson

PCW Details

Price £70.44 (£59.95 ex VAT)

Contact Pow! Distribution 01202 716726
www.pow-dist.co.uk

System Requirements Windows 3.1 or higher.

Good Points Clever automatic relational links. Easy document management.

Bad Points Limiting. Not always easy.

Conclusion A brave attempt to make an easy relational database.

★★★

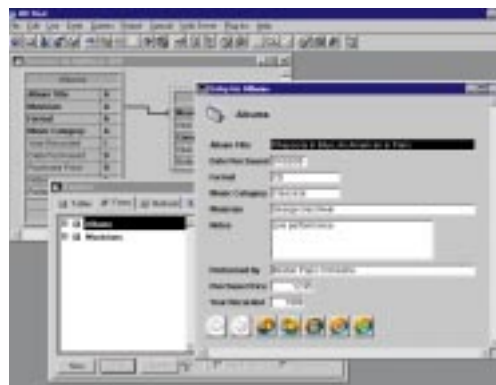
4D First 6.0

Create custom databases. If you want a marriage between Mac and Windows, it's worth a try.

ACI's 4th Dimension range includes 4D First; an introductory package providing a complete programmable database system. The box claims it is "a powerful database that eliminates the need for programming," yet the online help has a section on why 4D First requires a language.

Despite its interactive features this is, at heart, a tool for creating custom database solutions. Creating a database the 4D way starts with an empty grid, where you define the structure of a table the old-fashioned way. 4D will then automatically create a data form, complete with navigation buttons.

It is easy to create a list of choices for a field. There is a query editor and quick report generator, which provide the bare essentials of a database application. ACI could do a better job, though, if it were serious about making an end-user database. For instance, the label wizard requires most settings to be entered manually, instead of using an Avery number as a one-click solution. Another weakness is that many dialogs are non-standard and have no help button.



Overall, 4D's interface is not easy to use and its wizards are complex dialogs rather than step-by-step solutions. Integration with other applications is poor, with only basic OLE embedding supported. But 4D First is not a bad product; it is just unsuitable for end-users. It is worth investigating if you want a cross-platform Mac/Windows application and it has interesting web features, with a built-in web server so you can publish 4D forms on an intranet. Browsers which point at its web server are treated as

First is ideal for cross-platform developers but not an end-user system

clients in a client-server system. Sadly, 4D First allows two simultaneous client connections only, making it suitable for testing or small intranets. Its strength is that it is better for developers than its main rival on the Mac and, with its server product, bridges the gap between desktop database managers and SQL-based systems.

Tim Anderson

PCW Details

Price 4D First 6.0 £101.28 (£119 ex VAT)

Contact ACI 01625 536178 www.aci.co.uk

System Requirements Win95, NT, Mac 7 or later

Good Points Instant web publishing. Extensive language, and scales to client-server if required.

Bad Points Fails to achieve ease of use for non-programmers. Non-standard interface and complex dialogs.

Conclusion Access and FileMaker are safe; cross-platform database developers should investigate.

★★★

Software

Trellix

HTML-savvy word processing — useful document mapping gives it an edge over the others.

I first saw Trellix at the Comdex show in the US last year, billed as the “word processor of the future”, designed from scratch for hyperlinked documents. It can output them either as web-standard HTML or in a proprietary format for which a free viewer is available. The Trellix format is of most use for personal, intranet, or disk-based documents which do not require a fat viewer to be downloaded across slow net links.

It does look a lot like a word processor except that the screen is split into two. The upper part shows a document map and the lower is the editing area. Pages are based on a rich choice of templates which will be useful to inexperienced users wanting to knock out some web pages quickly. More ambitious users are likely to be frustrated by the limited formatting and image handling.

The document map is what gives Trellix its major edge over an HTML-savvy word processor.



You can add pages at the click of a mouse and shuffle them around like sheets of paper; any hyperlinks affected are updated automatically.

Trellix's weakest point is its test-viewing facilities. The editing screen has a view mode but Trellix admits that the display might not translate exactly into HTML. In any case it is advisable to test HTML pages on both the Netscape and Explorer browsers.

The split screen, with its useful document map

Trellix could appeal to users of non-HTML word processors who want to experiment with hypertext. The document mapping might be useful to researchers and authors of complex works but it's up against hefty competition, not least Microsoft Office, the next version of which will treat HTML as a native format. If it survives, Trellix could mature into a good product.

Clive Akass

PCW Details

Price US price \$99; UK price to be announced. Trial copy from www.trellix.com

Contact 00 1 781 788 9400 www.trellix.com

System Requirements Windows 95 or NT 4.0.

Good Points Low cost; simple; document mapping.

Bad Points Poor image handling; limited formatting; cumbersome HTML testing.

Conclusion Has many good features, but so have its competitors.

★★★

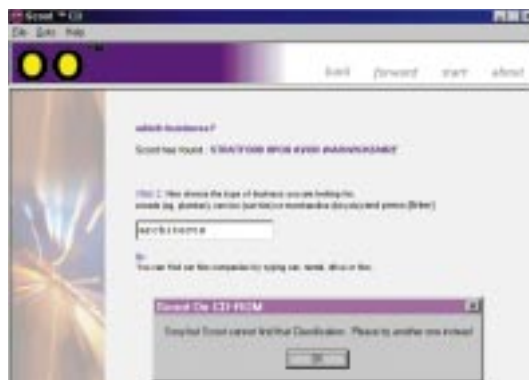
Scoot

A CD-ROM directory which could have nearly all the answers — if you can be specific enough.

Selling the numbers of directory services available on CD as well as on the internet comes Scoot. It is owned by Freepages and has a web site (www.scoot.co.uk) which does much the same as the Yellow Pages site.

Having the directory on CD-ROM is a big advantage as you do not have to log on every time you need to find a name and address. This saves online time and is a good back-up when your ISP goes down. But for any CD-ROM directory to work well it needs two things: a wealth of information and a very efficient search engine. Scoot's performance in both instances is no more than so-so.

When you launch the CD you are asked to specify a place. You must be accurate: calling Stratford-Upon-Avon by the name “Stratford-on-Avon” will receive a curt dismissal. If you choose somewhere large, like London, you have a couple of screens in which to specify the area a little better. This cuts down the number of answers to your queries, which could be good or bad



according to what you are looking for. If you are hunting for something obscure, you may have to perform more than one search.

Next you choose a category. Our categories were rejected more often than they were allowed, even if we specified a category which existed at a lower level on the search path. For instance, we entered “architects” but were told this didn't exist. When we specified “design”, an “architects” category appeared. When we tried again with the singular “architect”, we were more successful.

Scoot's search engine is not all that clear

For almost every category we tried we got no more than 15 results. There were also few entries with more information than you would find on the ads in any book-form directory. So why would you want to use this form instead of a good internet site or a book? Well, it does cover the whole country. But if you have an internet connection, try the Yellow Pages site, instead.

Adele Dyer

PCW Details

Price £14.99 (£12.76 ex VAT)

Contact Scoot 0171 368 3900 www.scoot.co.uk/cd_rom

System Requirements Windows 95

Good Points Covers the whole of the UK, with two million business.

Bad Points Bad search engine. Still not enough content.

Conclusion If you have an internet connection go straight to www.eyp.co.uk or www.scoot.co.uk

★★★

Redshift 3



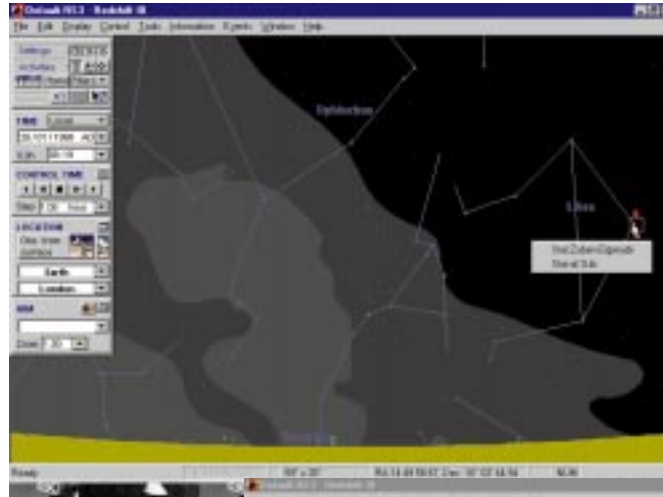
The cream of space-age knowledge has got better, with more tours, news and information.

Redshift is an award-winning desktop planetarium. Since it was first released it has established itself as the premier astronomy package. The key to its success is the design, which makes it simple for the beginner to get to grips with astronomy, yet providing such an extraordinarily high level of accuracy that it is also a valuable tool for the enthusiast.

At the heart of Redshift is its real-time representation of the night sky; that is, the night sky as it appears right now. Every pinpoint of light is displayed. Just move your mouse pointer over any object and its name appears. Click on your mouse and details pop up in a dialog box. Redshift will also let you view the night sky from any time or place in history so you can see what the sky would have looked like on the eve of the Battle of Hastings, or how it would have been seen by the Pharaohs of Ancient Egypt. But Redshift has always been much more. It has contained loads of pictures of the planets in the Solar System, bags of information and the complete Penguin Dictionary of Astronomy, to name just a few of its features.

Redshift 3 is a major upgrade. The enhancements to Version 3.0 hit you between the eyes from the moment the CD loads. To begin with, there is a new interactive introductory sequence which shows how Redshift can be used, and previews most of the more spectacular features. Going to the program itself, existing users will immediately be struck by the completely overhauled interface. There are new control panels, making it easier to use Redshift, not that it was difficult before (now even the most computer illiterate would-be astronomer will find their way around Redshift's features without any trouble whatsoever). The more experienced user will also appreciate the extended control possibilities which provide the opportunity to do more with the CD. New users will also benefit from the upgraded help system, which offers context-sensitive help, guided tours demonstrating each of the control panels and an online manual.

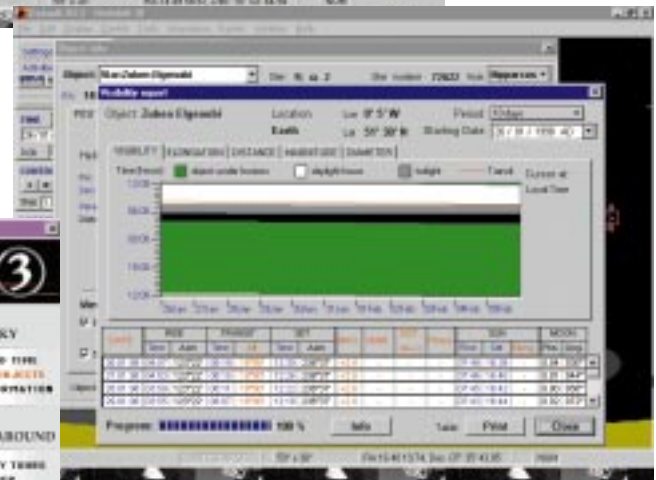
The information contained within Redshift has been brought fully up to date with the



Left Want to know the name of that pinpoint of light in the sky? Simply put the cursor over it and click: Hey! it's Zuben Elgenubi in the constellation of Libra

Below Want to know more about Zuben Elgenubi? Redshift 3.0 has screens of information for the serious enthusiast

Below Navigating the night sky is made easy with Redshift 3



and the latest photographs from the Hubble telescope, and Galileo and Pathfinder. The catalogues used in Redshift have also been thoroughly updated. For stars, the brand new Hipparcos and Tycho catalogues, created by the European Space Agency, are used. These were created as a result of a major ESA project which mapped over a million stars to create what must be the most complete and accurate star catalogue to the 12th magnitude. For more distant (otherwise known as Deep Sky) objects, the program uses the Sky Catalog 2000 from Sky Publishing, which was chosen because it probably provides the most consistent and representative data.

A small but really useful new feature is News. This is simply a month-by-month list of things to look for in the night sky. This includes meteor showers, conjunctions, eclipses, phases of the moon and so on. This feature

incorporation of the 1997 revised edition of the Penguin Dictionary of Astronomy,

makes looking at the night sky all the more fascinating, but is also a way of interesting the younger members of the family in the sky at night.

More than 50 all-new astronomy tours have been added and the sky simulations have been improved to near photographic quality with the inclusion of bitmap images of galaxies and nebulae, the Milky Way and even comets. The received impression is therefore much closer to what you would see through a telescope than has been the case with previous versions. In fact, a lot of effort seems to have been invested in improving the visual quality of the program overall. There are better planet/moon bitmaps which include texture mapping and the movies have been improved and include 16-bit sound.

Paul Begg

PCW Details

Price £29.99

Contact Dorling Kindersley 0171 836 5411;
www.dk.com

System Requirements Windows 95 only

★★★★★

Sightings' UFOpedia

From American TV, this informative CD-ROM teaches you what's what about all things alien.

No matter whether you believe UFOs are spacecraft from another planet, just atmospheric phenomena, or a figment of the imagination, it has to be admitted that some of the stories are astonishing. People have seen and even filmed sights in the sky which seem to defy explanation. Apparently sane, rational, people have talked of meeting aliens and have even been abducted by them. And, of course, there are the truly extraordinary tales associated with Roswell and elsewhere, including the film footage purporting to be of an autopsy on the pilot of a crashed UFO.

Sightings is an American television show which has been running for five years and is now shown in at least a dozen countries around the world. Each week, the programme reports on and investigates reports of paranormal and supernatural events. The content of this CD-ROM, drawn from the Sightings files, is a comprehensive encyclopaedia of UFO reports.



The UFOpedia is divided into five main sections: introduction, alien life, government, UFOs and database. These deal with almost every aspect of the UFO mystery, from whether or not there could be life elsewhere in the universe, through alleged government cover-ups to supposed secret bases where, it has been claimed, crashed UFOs are held. Each section is divided into sub-sections. The section

Find out about the Grays before they find out about you!

on UFOs, for example, has an introductory overview followed by other sections dealing with the myths and legends associated with UFOs, the types reported, crop circles, sightings and hoaxes.

The database is extensive. You can search for a sighting alphabetically or by time, location, phenomena, evidence, or any combination. There is access to an online database via the internet, so the UFOpedia will always be up-to-date with the latest reports and news.

Paul Begg

PCW Details

Price £29.99

Contact Anglia Multimedia 01273 821104;
www.anglia.co.uk

System Requirements Win 3.1/Win95

★★★★

PhotoDisc Collection

Pssst!... Want to get into pictures? — There are thousands of top-rate photos on this disc.

Looking for a picture of Europe taken from space? Some hand-prints on a sandy beach? A face? The PhotoDisc collection, a library of CD-ROMs archiving over 20,000 pictures from award-winning photographers, brings all these images and more to your PC or Mac. Spectacular shots of our planet, colourful arrangements of crayons, and groups or portraits of all types of people build this library of stock photography into a valuable resource for web designers and desktop publishers alike.

Preliminary layouts or website designs can be made using the low resolution previews, to be replaced on final printed output by the medium or high resolution duplicates on each disc. Choosing the image you need couldn't be easier using the free selector included. The Starter Kit, a pack of two discs and two full-colour indexes, includes all the most recent additions to the range, in low resolution format:



use these images to plan your publication before ordering the appropriate high-resolution duplicates. To prevent commercial use of the low-res samples in the pack, each is branded with the PhotoDisc logo.

We particularly liked the Animation Series, which can add sparkle to any web site. A choice of animated gif or Shockwave files, which act or make appropriate noises each time a mouse pointer is run over them, lets you

Which pic? It's your choice

place ringing phones, shaking cones, or out-of-control shopping trolleys on your home page. An HTML front-end and all relevant plug-ins are included on the disc to let you view the animations through your web browser. A further 30,000 images are available for download.

There are few restrictions on use of the PhotoDisc images and all are clearly detailed in the licence agreement. Registering discs gives you the chance to win a further five PhotoDiscs of your choice and if your selection does not meet your needs, returning it within 30 days guarantees a refund.

Nik Rawlinson

PCW Details

Price Starter Kit £39. Animation Series £99. Animation Pro Series £199. Background Series £139. Signature Series £199. (All ex VAT).

Contact Photodisc 0800 697622;
www.photodisc.com

System Requirements Windows 95 or NT 4.0

★★★★

Software

Euopress Family Encyclopedia



Does this encyclopedia match up to the ever-present benchmark that is MS Encarta? Read on.

Ever since Microsoft released its first version of Encarta in 1992, any other multimedia encyclopedia automatically had its work cut out. Since then, some encyclopedias have tried to get ahead by concentrating on writing for younger children, one area in which Encarta is not so hot. The Family Encyclopedia is not aimed at a specific age group and does not pretend to be geared towards sections of the National Curriculum, but the way it is written and laid out suggests that although it could be used by any age group, it is aimed at a younger audience than Encarta.

Euopress' Family Encyclopedia is based around the Cambridge Encyclopedia and incorporates more than 20 other reference works. This is not immediately apparent to the user as all the information has been mixed into the melting pot, so you are only aware of using a single work. Even the dictionary is well integrated, so you don't have to leave what you are doing to use it: simply double-click on any word about which you are unsure and the dictionary entry pops up.

The multimedia content has not been skipped. The encyclopedia takes up two CDs, like the latest version of Encarta (although this actually has three in the Deluxe

version if you count the Research Organiser), so there is room for 50,000 articles, 100 videos and 30 animations, as well as 10,000 photographs, 500 charts and tables, and 1,000 sounds. The last covers everything from animals, to snippets from the works of great composers.

The material Euopress has used seems, for once, to be truly international. There is plenty of information on Britain but the rest of the world has not been forgotten. There is more than enough information on specifically British subjects such as Anglo-Saxon Britain and the Norman conquests, to keep most UK users happy; unlike Compton's (reviewed *PCW* March '98) this encyclopedia knows where Kent is and what are her main towns and industries.

There are numerous chapters on various subjects which can be used as a starting point for getting you interested: these cover British, Australian and US history. Other chapters are more general and cover such things as the



Left These chapters can help with school projects

Below, left The main screen is easy to navigate



here, for instance, and it does not create a bibliography, but it is easier to use and more immediate for younger children.

The search engine is good. It

enables you to create Boolean searches and returns a good number of entries for most queries. The articles are well written and contain plenty of information in a form that is mostly easy to understand and assimilate, but which also stimulates your curiosity. They are of a good length, giving you most of what you need, especially with the list of half a dozen or more links suggested on each page, but the articles are not so long that you give up before the end. The articles are up to date and cover such events as the Queen's visit to India and Pakistan last October, and the funeral of the Princess of Wales. The articles are supplemented by an online section and there are monthly updates to be downloaded from the net.

Whether you opt to buy this encyclopedia will depend largely on the age of your child. It is probably one of the best at crossing the divide between Encarta's high ground and the most basic information of products like DK's Children's Encyclopedia. Adults will find it enjoyable, children will find it accessible. While it is much cheaper than Encarta, it is not as feature rich. But as a more reasonably-priced encyclopedia, it should satisfy more users.

Adele Dyer

history of medicine, astronomy and archaeology. Some chapters could be useful for school projects, such as those on castles and cathedrals or the one on Native Americans. All these chapters are taken from various books written by experts, but they do not quite match up to Encarta's essays where known experts give views on their own specialist subject. In other ways, however, these chapters are far more accessible than Encarta's, especially for younger users.

The Family Encyclopedia has its own version of Encarta's Research Organiser, albeit a far simpler version. You can put projects together using a simple dialog box which lets you put together pages from the CD which can then either be played back as a slideshow or viewed interactively (i.e. you choose when you want to turn to the next page). This is a nice way of gathering work for a project but it is less adaptable and less rigorously academic than Encarta's version. You cannot add extra notes in

PCW Details

Price £39.99

Contact Euopress 01625 859333

www.euopress.co.uk

System Requirements Windows 95

★★★★

■ Software

Little Mermaid Story Studio

Budding Walt Disneys can create blockbusters in this Story Studio. It's something a bit different.

Disney has launched The Little Mermaid Story Studio in place of its animated storybook format, to coincide with the film's re-release this Easter. Story Studios have plenty in common with Disney's animated storybooks: you can read or listen to the tale, clicking to turn pages and make illustrations come alive. You have the ability to move around the story, reading pages in whatever order you want, and there is thesaurus and dictionary help for highlighted words.

What's new is a collection of creative ideas that address the boredom which creeps into storybooks once they have been re-read. You can create your own story, compose underwater music and design your own grotto, activities which are different each time you play. Our testers loved making a grotto. Click on the sea life of your choice and it joins the other fish swimming around. Some fish do not mix, like electric eels and lantern fish, so our testers were quick to remove the eel from their grotto, given that he electrocuted everything he touched. Plant life



and corals can be added to the ocean floor and by snapping fish with the virtual camera you can print out fact cards about the different species.

Composing music is fun, too. There are Coral Reef singers, sea-shell instruments and sound-effect fish to click and record. You can make your own tunes or follow the song book to play songs from the film.

Creating your own story is the most

challenging of the new features. You start with the background illustrations, characters and captions from Disney's story; this helps because you already have a theme with a beginning, middle and end. Your job is to make an adaptation. Maybe your version has extra mermaids or you could liven things up with the addition of a few electric eels.

There are special, hidden stickers to collect from the storybook pages which allow you to further customise your story.

Debbie Davies

PCW Details

Price £34.99

Contact Disney Interactive 0181 222 1571
www.disney.com

System Requirements Windows 95/Mac

★★★★

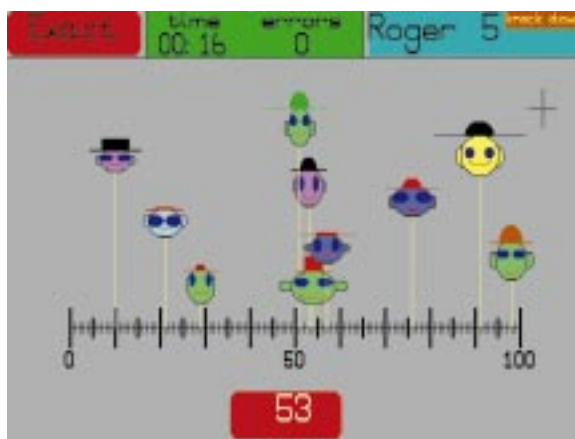
Numbershark

If your memory of maths lessons ranks akin to being eaten alive by a shark, try this CD tutor.

White Space has a formidable reputation with primary school teachers, many of whom already use Wordshark, the company's literacy program. Now the company has launched Numbershark to teach numeracy to children aged six and over. It may have similar objectives to the Government for teaching maths, but Numbershark's approach is quite different. Education Ministers remain tentative, hoping that children will be able to cope with maths in adulthood. But Numbershark wants children to conquer their difficulties so they can positively enjoy maths.

There are 30 games, each finely graded. Some add meaning and understanding to addition, subtraction, multiplication and division. Others allow you to practice what you know. All teach fluency in mental arithmetic. It is at its best with tricky concepts like swapping tens for units, or understanding that one of the numbers in a multiplication or division equation stands for a number of groups rather than a number of objects.

Numbershark's graphics are a surprise to those used to US west coast-style animation. The mix of stick men and silhouette shapes could hardly be more basic but they communicate with



children as effectively as the simple graphics which Bandai uses on its virtual-pet screens.

In testing, our six- and eight-year-old children loved the games. Older children realised for the first time that adding or taking away nine is easier if you use ten instead and then recalculate one up or down. As with Kumon maths, there is plenty on the value of numbers. Games make you instinctive about where, on a board of numbers up to 1,000 or more, one would place a figure.

As the price tag suggests, the content of the program is vast, and the incremental steps for each game are kept as small as possible so that the maths is never too difficult: as soon as we set problems which were too tricky for our testers, they disliked the program. The onus is on the parent to log their child in and oversee their choice of games and the level at which they play. For parents prepared to take the time, Numbershark promises to make pocket calculators almost redundant.

Debbie Davies

PCW Details

Price £59

Contact White Space 0181 748 5927
wspace@btinternet.com

System Requirements Win95, Win3.1 or higher

★★★★

LaTeX

In love with LaTeX: this word processor, freely available on the internet, is one academic's dream app.

Although I seem to be in a shrinking minority, I am sure there are plenty of other people out there who don't use Microsoft Word or WordPerfect. Although WYSIWYG applications are widely used in offices, there are environments where these programs just do not cut it. I'm a Ph.D student and, at my university, like most others around the world, LaTeX is considered the perfect application for text processing and has a comprehensive set of macros for the typesetting system, TeX.

Setting text with either TeX or LaTeX is similar to writing HTML pages: you write a simple ASCII file containing the text, interspersed with special tags. There are tags for setting the margins, fonts, special symbols such as foreign characters, text alignment and many other features.

The main difference is that the text is not interpreted by a browser. Instead, it is compiled by the user with a program called Latex. Confusingly, both TeX and LaTeX are programming languages, while the program Latex acts as a command-line compiler. This produces an object file in .dvi (DeVice Independent) format which can then be previewed or printed using the appropriate drivers.

The procedure looks strange and cumbersome when compared to the usual approach to word processing, but it offers several advantages. Firstly, LaTeX only uses memory and CPU during compilation, while any WYSIWYG word processor is a constant memory- and CPU-hog.

Secondly, the user need not own a powerful computer, or even have a GUI, to use LaTeX. All that's needed is a text-only terminal, which is important at universities and research centres. In addition, it lets the user choose their favourite editor. I use a light Emacs clone called Jed, which has many facilities which help when writing LaTeX text. Thirdly, LaTeX was designed to be portable. Anyone who has ever tried to exchange Word files knows that serious troubles can arise.

There are ports of LaTeX for virtually every 32-bit platform, from PCs to mainframes, and a LaTeX file will compile on any of them. Moreover, it is free, and available by anonymous FTP from several sites.

The main advantage of LaTeX is its power. It is easy to accomplish many tasks that are difficult



Left LaTeX's strong point is its ability to reproduce Greek letters and maths symbols

Below, left A page from the Cambridge Computer Lab server

LaTeX can produce work for which you'd normally need something like Quark XPress.

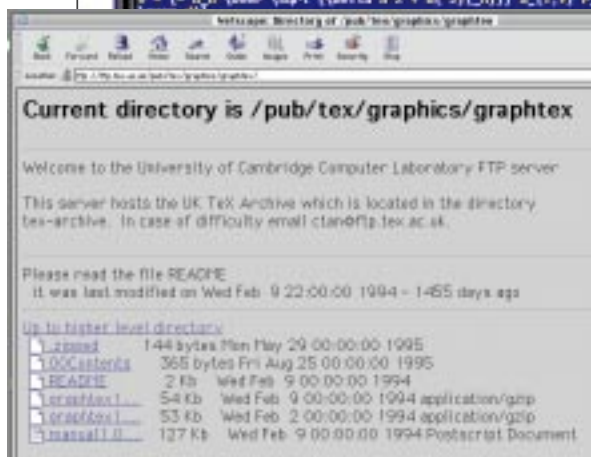
The program's strong point, though, is its ability to typeset maths. There are tags for Greek letters and a huge array of maths symbols — far more than the relatively few provided by, say,

WinWord. These tags are often quite intuitive. For example, what symbols would you think \alpha, \leftarrow, and \aleph represent? (Most mathematics books, and virtually all research papers, are written in LaTeX.) However, it is not as intuitive as a word processor and the user must study it first. There are many guides to this software freely available on the net and, in my experience, it takes only a couple of hours for a newcomer to get the hang of it.

I am very satisfied with LaTeX and use it for all my written material. A

convenient site, which holds both packages and documentation, is shown below. If you are dissatisfied with Word, you should give it a try.

Guido Gonzato



or even impossible to achieve using word processors. Writing long documents such as a book, complete with table of contents, cross-references, indexes, pictures and so on, is a piece of cake. LaTeX encourages the writer to concentrate on the content of what he or she is writing, instead of the appearance. For instance, font size and style (and even the section number) are automatically handled by tags such as \section or \subsection.

There are several predefined styles, plus macros and tags for including PostScript pictures and for resizing, rotating, and moving them on the page. You can also define tables as frames, to obtain effects that no word processor can handle, such as tilted text. To some extent,

PCW Details

Price Freely available by anonymous ftp.

Contact <ftp://ftp.tex.ac.uk/pub/tex>

Good Points Portable. Powerful. Free.

Bad Points Not WYSIWYG. Cumbersome setup. Requires some learning.

Conclusion Suits students, scholars, and anyone looking for a decent maths word processor.

★★★★

We welcome readers' contributions to our *Long Term Tests* section and pay for those we publish. If you've used a piece of hardware or software for some time, write a 300-word piece for hardware or 650 words for software (plus GIF-format screenshot for the latter) and send it on disk in MS Word or ASCII format to Lynley Oram at the usual PCW address, marking your envelope "Long Term Test". Or email it to lynley_oram@vnu.co.uk

Partition Magic 2.0

Partitioning is such sweet sorrow. But it needn't be: modifying a hard disk is easy with this magic program.

About a year and a half ago I noticed a product called Partition Magic 2.0. It seemed like a nice little utility, enabling users to create, delete and modify partitions without the usual hassle involved in such an exercise.

A hard disk can be split into a number of partitions, each having a percentage of original disk space. These effectively work like individual hard drives. You tend to use partitions when you want to install a number of operating systems, have large separate amounts of data or a large hard drive.

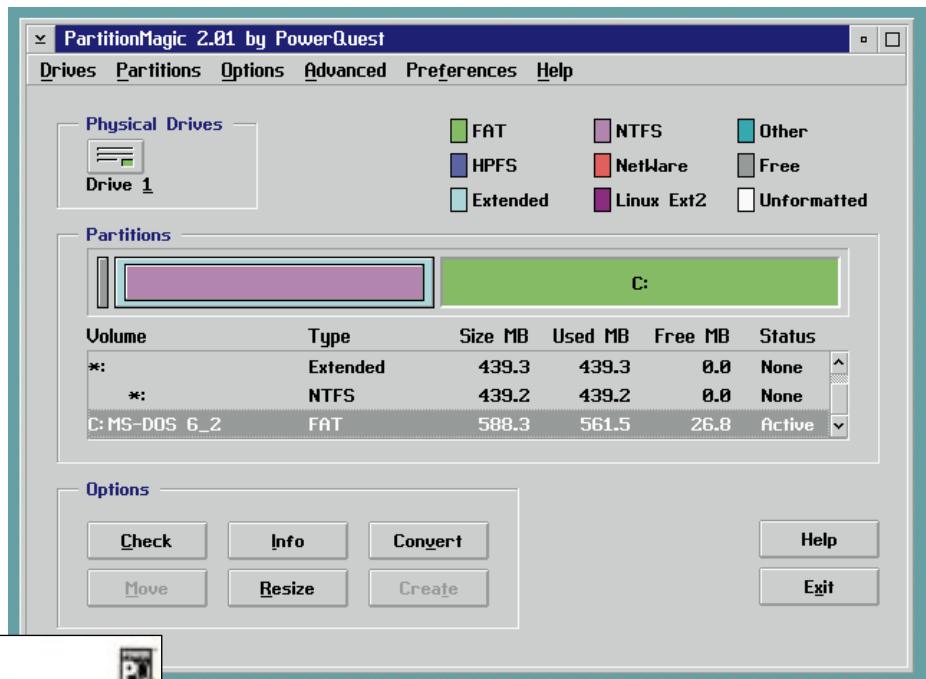
Until recently, partitions could only be set up easily at the time of installing the operating system(s). This was because programs like FDISK (which comes with DOS) can add and delete partitions but cannot re-size them. If you had 1Gb of space and created two 500Mb partitions, the only way to change the partition sizes would be to delete both partitions. Then you would have to create new partitions and begin to install all your software again.

People using DOS or early versions of Windows 95 will have a FAT (File Allocation Table) partition. Other common types include: FAT 32 (used in later versions of Windows 95), HPFS (High Performance File System) used with OS/2, and NTFS (New Technology File System) for NT. Less common types include NetWare and Linux Ext 2.

There is also a special type of partition, called a boot manager, which is about 1Mb in size. When the machine boots, it runs a program from the boot manager which enables you to choose which operating system to start.

Among other things, Partition Magic can move, delete and create most types of partitions, as well as re-sizing FAT and HPFS partitions — it can even convert FAT partitions to HPFS. At the time that Partition Magic first caught my eye, I had a machine with two hard drives, both of which were in need of re-partitioning. One, a 170Mb IDE hard drive, had a boot manager and FAT partition. The other, a 214Mb IDE hard drive, had a single FAT partition.

There are two operating systems on this



Partition Magic can move, delete and create most types of partition, as well as resizing FAT and HPFS partitions

machine: OS/2 3.0 Warp installed on the 214Mb drive, and DOS 6 with Windows 3.1 on the other. OS/2 supports HPFS and FAT types, but by mistake I installed it with the FAT option. It should have been installed with the HPFS option because these types of partition are generally faster, support long file names and don't need defragmenting.

My plan was to change the FAT partition on the 214Mb to HPFS, shrink the FAT on the 170Mb drive and create a new HPFS partition on that drive, too. Partition Magic did this with no problems whatsoever.

Since then, I've acquired a 1Gb SCSI drive and installed NT 4.0 as my new, main operating system. Partition Magic coped with the changes I wanted to make and at times I have all three operating systems running happily on the one machine. Right now, I'm using NT for most things but still have a DOS and Windows partition for games and so on.

That it can reduce cluster sizes on some FAT partitions, is another good thing about this product. FAT partitions are made up of clusters, a cluster being an amount of memory on the

disk. When the operating system loads a file from the disk, it reads it in, cluster by cluster. With FAT partitions a file can only begin at a start of a cluster, which means that if a file is not the same size as a cluster, a space will be left between that file and the beginning of another. This reduces the actual amount of usable space on the drive, so the smaller the cluster size, the less space is wasted.

In some cases, Partition Magic 2.0 can increase the disk space on FAT partitions by as much as 40 percent, a mighty big saving especially if storage space is at a premium.

Glenn Turner

PCW Details

Price The latest version, Partition Magic 3.0, costs £57.58 (£49 ex VAT)

Contact POW! Distribution 01202 716726
www.powerquest.com

Good Points One of the best manuals for software I have ever seen.

Bad Points Expensive if not used often. Some knowledge of partitions handy.

Conclusion An absolute godsend if you need to partition your hard drive.

★★★★

■ Software

2 YEAR
TEST

CompuServe

Get on the internet with this trusty provider, but be warned: it may be pricey if you get addicted to surf.

CompuServe started life as a dialup bulletin board system (BBS) in Ohio. I have found the technical support forums to be a great source of useful fixes, advice and information. If you can't find a suitable file, you can leave a query on the message board, talk to other people or ask the CompuServe forum staff.

To do this on the internet requires trawling through web site after web site, using one search engine after another, finding suitable newsgroups, looking for email lists, hunting through IRC... I just haven't got the time.

CompuServe has a deal with PA which brings a near-instantaneous newswire service to its subscribers. There's a search engine for all of CompuServe, as well as online support. But strangely, CompuServe lacks an Irish forum.

Of course, the company also offers access to the internet. You can still run all the usual internet software in conjunction with CompuServe's own



Connection is quick, provided you're using the 16-bit CompuServe 2.6 rather than the newer 32-bit version

(which is treated as one more internet app by the Winsock). CompuServe is presently converting all its content to HTML format, so a browser will shortly replace the free proprietary software — good news for people whose hardware or O/S is unsupported. Connection to CompuServe is quick, especially for users who, like me, kept the proprietary 16-bit Windows software

CompuServe 2.6 (pictured), which is far speedier than the newer 32-bit version.

I'm pleased with the software's flexibility, which allows multiple setups for home and elsewhere. There's a filing cabinet for saved messages and email works well, but the proprietary use-net reader is clumsy. Much of its content is gathered together in forums containing file libraries, a chat area, message board and live text-based, on-screen conferences with famous people. Fees appear pricey, but not if all you need is email and occasional help or entertainment.

Joe Tarrant

PCW Details

Price From £6 for five hours access.

Contact CompuServe 0990 000200; www.compuserve.co.uk/

Good Points Well-indexed content. Good net access.

Bad Points Expensive for heavy users. Clumsy usenet reader.

Conclusion A must for information addicts.

★★★

■ Hardware

7 YEAR
TEST

Ti'ko 386SX

Why the rush to upgrade? If your trusty old PC still does everything you need, what's the problem?

In 1991, having spent hours poring over mail-order ads and system reviews, I decided to buy a PC from Ti'ko. Money was tight, and I had to exceed my budget of £1,500 to get a machine boasting a 386SX processor, 4Mb RAM and an 80Mb hard drive. Compared to the BBC it replaced, my new PC was blisteringly fast. Graphics with the 1Mb Orchid Pro Designer II were particularly stunning.

A year later, Ti'ko offered a relatively inexpensive upgrade to a 486DX/33. This was a double blessing, as an intermittent fault in the keyboard socket on the 386SX motherboard kept reporting the error message: "Keyboard missing. Press F1 to continue". I also ordered a larger hard drive. PC-less weeks

followed and I spent a fortune ringing Ti'ko in Scotland. Only two days before Ti'ko ceased trading, my upgraded PC arrived. Relief at this narrow escape was tempered by the cheese-grater sounds coming from my new hard drive and I had to buy a replacement. Over the years I've added another 4Mb of RAM, a sound card and a CD-ROM drive, with frequent changes of scanner and modem cards. Ultimately, a virus cleared both hard drives, but at least this gave me the opportunity to return sanity to a filing system abused by years of magazine-CD trial installations.

In the past five years the only other component to have caused trouble was the CMOS battery, so that after a week's downtime the drive information would have to be

re-entered. I soon got fed up and thought I would have to get another motherboard. But before paying out more money, I tried a trick I knew of: a little cleaning solvent judiciously applied, and I've since had no trouble. I now use a P133 and my wife and son use the 486. The Ti'ko is worth more than the sum of its parts to me. I could justify replacing it completely, but why? It may be obsolete and unsupported, but it works.

John Ralph



PCW Details

Price £1,559 (£1,355 ex VAT) new. Upgrade to 486DX with 350Mb hard drive, £757 (£658 ex VAT)

Contact Company no longer trading.

Good Points Enormous case for ease of expansion. Reliable. The Orchid card is still good.

Bad Points Meagre 4Mb memory. The original hard drive with incredibly small 80Mb storage space.

Conclusion A great workhorse.

★★★★



Going flat out

Adam Evans and Paul Trueman put Alpha and Pentium II-based muscle machines under starter's orders for a two-horse race. Like to place any bets?

Here at PCW there are many things that make our mouths water, but the thing which really gets our juices flowing is *power*. As we write, teams of lackeys are engaged in a round-the-clock mopping-up operation as we drool over the prospect of getting our hands on the two most powerful systems ever to grace the pages of this magazine.

The first contender in this battle of the heavyweights is a Digital Alpha-based machine from Mesh Computers running at a staggering 533MHz. The other challenger, from Armari, boasts two of the latest Intel Pentium II processors running at 333MHz. Both have 128Mb of memory fitted as standard, plus a top-of-the-range 8Mb graphics card. The operating system of choice for these high-end desktop systems is Windows NT 4.0.

In truth, monster machines like the Mesh and the Armari are a little overpowered for typical office applications. You may be able to calculate a spreadsheet in an instant but you will be paying through the nose for the privilege. You can save hundreds, if not thousands, of

pounds if you are prepared to wait a second or two. The area in which Alpha and dual Pentium II machines really come into their own is in serious number-crunching applications such as graphics rendering. This is why, as well as running the standard BapCo office applications test, we have designed a new benchmark for ultra high-end PCs using the leading professional 3D animation package, LightWave 3D 5.0.

Despite the heady excitement of reviewing these two machines, we have not lost sight of our normal reviewing criteria. Build quality and value for money will play just as important a part as raw power in determining which comes out top in this heavyweight contest.

Warning! *The next three pages contain two of the most powerful desktop systems known to man: people with a nervous disposition or a history of heart trouble are advised that PCW takes no responsibility for palpitations caused by desire for these monster PCs. Read on at your own risk.*

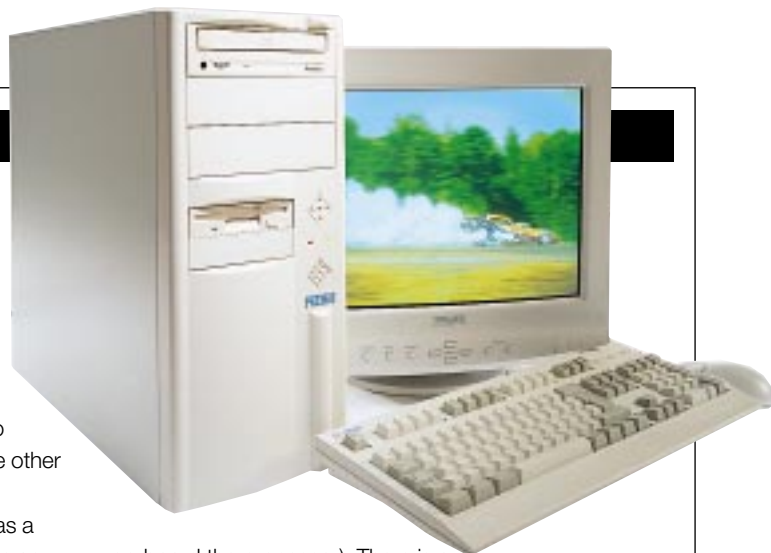
Mesh 533XG

The Mesh 533XG has 128Mb of memory, a 9.1Gb IBM Ultra Wide SCSI hard disk, a 32-speed Teac CD-ROM drive, a Matrox Millenium II 8Mb graphics card optimised for 2D graphics, and the excellent pin-sharp focus of Taxan's 17in Diamondtron monitor.

There is plenty of room for expansion, with two spare 3.5in bays (one facing the motherboard, the other facing the front) and two front-facing 5.25in bays.

The Alpha system architecture in all its glory

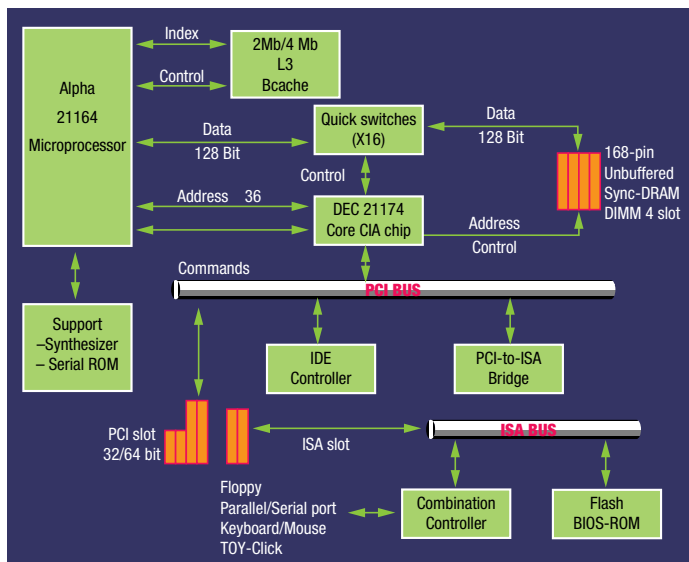
Samsung's motherboard, the Alpha 164SX, has a number of interesting features not usually found on an Intel-compatible motherboard. There are two heatsinks: one over the Alpha processor, and a smaller one placed on the motherboard's voltage regulator. The Alpha has a massive 2Mb of secondary cache (with primary cache



on-board the processor). There is a more expensive 164LX motherboard which has both primary and secondary cache on-board, with a tertiary cache of 2Mb. At the moment though, owing to the prohibitive price, Mesh has no plans to include the 164LX in its machines.

There are four PCI slots, two 64-bit and two 32-bit. One of the 32-bit slots is taken up with the Matrox Millenium II card, with one spare. (Mesh is currently using beta drivers which Digital has written itself, using source code from Matrox.) Both 64-bit slots have Adaptec SCSI cards in them, a large card with both Ultra-wide and SCSI-2 connectors and a smaller card with a SCSI-2 connector only. Mesh uses the Ultra-wide to connect to the hard drive and leaves the SCSI-2 on the same card free, using the other card's SCSI-2 connection to link to the CD-ROM drive. Mesh tells us this is because the larger dual-socket card does not have dual channelling, so connecting the two drives to the one card would have created a bottleneck in the system.

The motherboard has 64-bit PCI slots but there are few products currently on the market that take full advantage of them. However, a variety of 64-bit PCI cards are in development — very high speed disk controllers, for example. Meanwhile, standard 32-bit cards can be fitted to the 64-bit slots.



Alpha: software

The accusation most commonly aimed at Digital Alpha-based systems is that they lack compatible software. This may have been true once, but not any more. Digital claims there are already 2,800 native Windows NT applications for Alpha and that this number is increasing by more than 80 a week.

This trend seems likely to accelerate following a new partnership deal with Microsoft, which guaranteed to ship Alpha and Intel versions of Windows NT 5.0 simultaneously later this year. NT 5.0 is 32-bit code but the Alpha version will use 64-bit addressing to speed memory transactions up to a hundredfold; it will also address way beyond NT 4.0's maximum 4Gb of RAM.

Microsoft is due to ship a full 64-bit version of NT around the time Intel launches its first 64-bit chip, codenamed Merced, next year. In addition, NT 5.0 will pack Digital's FX!32 emulation software which allows Alpha to run 32-bit Intel apps. Digital claims any performance hit from the emulation is offset by Alpha's speed. Microsoft has also tentatively agreed to release an Alpha native version of Windows 98, albeit probably long after the release of the Intel-based version.

Currently, only 533MHz and 400MHz Alpha 21164 chips are available, but a new 600MHz Alpha 21264 will ship later this year. This is expected to clock 1GHz by 2000AD and Digital claims it will be twice as fast as Merced.

• See *News Analysis* (p40) for more details, and news of Compaq's buyout of Digital.

PCW Details

System Alpha 21164 533MHz processor, 128Mb SDRAM, IBM 9.1Gb 9ZX Ultra-wide SCSI hard disk, Matrox Millenium II 8Mb graphics card, 32X Teac SCSI CD-ROM drive, Taxan 17in Diamondtron monitor, Windows NT 4.0 Workstation

Price £3,288 (£2,799 ex VAT)

Contact Mesh Computers 0181 452 1111
www.meshplc.co.uk

Good Points Fantastic technical specifications at a (relatively) affordable price.

Bad Points Possible problems with drivers for extra hardware.

Conclusion An attractive proposition.

★★★★

Armari Rage Workstation

We could scarcely believe our eyes when we unpacked the Rage Workstation, one of Armari's Creative Environment range and designed specifically for applications such as high-end animation. Undoubtedly, it has the biggest case we have ever seen. After recovering from this initial shock, the lure of the two "red hot" Pentium II processors was too much to bear and we wasted no time in whipping off the case. The amount of free space was incredible: enough room to swing 30 cats and treat them all to a game of rugby afterwards.

Of course, the price you pay is that even picking up the case is an effort. But if you never intend to move your PC, these huge cases have a lot going for them. The

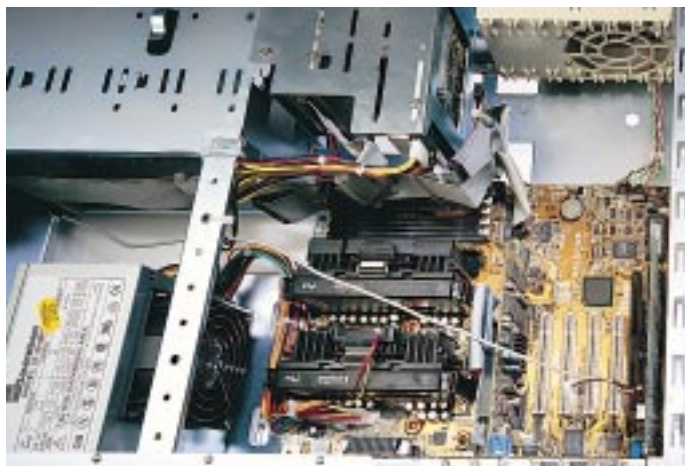
Armari has one hard disk, one

3.5in and five 5.25in bays free; room

for expansion on a scale seldom seen since Roman the Empire.

The memory chips occupy two of the four slots and there are three PCI, one ISA and one shared slot free (though you are limited to a maximum of seven cards, including the AGP slot). All the drivers and manuals are included for the various components and Armari also bundles Asymetrix 3D F/X and Asymetrix Video Producer. The hard disk is a 6.4Gb Quantum IDE allowing plenty of storage space. We thought the choice of an IDE hard disk was rather odd, considering that the Asus motherboard has built-in SCSI connectors. SCSI hard disks and CD-ROM drives do cost a few pounds more than their IDE counterparts but the performance

Spot the massive Pentium II processors!



Intel: software

Adding an expensive second processor to your system does not necessarily mean it will go any faster. Operating systems and applications have to be specially written to take advantage of the extra power. This "multi-threading" software divides the tasks between the two (or even four) processors and speeds up the system considerably. But a two-processor PC will not automatically run twice as fast as a single-processor machine; there are many more factors to take into account. Some software may use many complicated graphics, causing a bottleneck at the graphics card. This might mean the processors are idle for much of the time, waiting for the graphics to be displayed. Nevertheless, it has been known for dual-processor systems to run at over twice the speed of single-processor machines. This is to do with cacheing and optimisation of code and is far too complicated to go into here.

The NT 4.0 operating system has a small amount of built-in support for dual- and quad-processor systems. Many people are hopeful that Microsoft will address this issue in NT 5.0, due out within the next few months.

benefits, certainly in a system of this price and calibre, would seem to demand them.

Armari supplies the WinFast 3D L2300 AGP graphics card with this system. It has 8Mb of SGRAM (fast graphics memory) and is built around the Promedia 2 chip from 3D Labs. Graphics performance is not measured by our new LightWave benchmark which concentrates on the basic speed of the system. However, the BapCo test does take into account the graphics and hard-disk performance, in addition to raw system speed, and the WinFast card almost certainly helped the Armari to an immense 311 rating.

Bear in mind that the BapCo benchmark does not use multi-threading, so the score really only reflects one processor, together with NT 4.0's minimal multi-threading abilities.

The monitor is the much-praised Iiyama VisionMaster Pro 17. The picture is superb — sharp, bright and rock steady. The colours are vibrant and the on-screen controls are the best around.

PCW Details

System Two 333MHz Pentium II processors, 128Mb SDRAM, 6.4Gb Quantum IDE hard disk, 8Mb WinFast 3D L2300 AGP graphics card, SoundBlaster AWE 64 sound card, 24X Hitachi CD-ROM drive, Iiyama VisionMaster Pro 17 monitor, Microsoft NT 4.0 Workstation, Asymetrix 3D F/X, Asymetrix Video Producer

Price £3,519.13 (£2,995 ex VAT)

Contact Armari 0181 810 7441

www.armari.co.uk

Good Points Super-fast. Promedia 2-based graphics. Great monitor.

Bad Points Expensive. IDE hard disk. Dual processors only used by some software.

Conclusion It's a honey... if you've got the money.

★★★★

Head-to-head: who's on top?

Choosing the right system is all about knowing what you want to do with it and what software you intend to run on it. For pure speed and raw power there can be only one winner of this head-to-head battle of the systems: the Armari Rage Workstation. The LightWave 3D results were consistently better, with a Raytrace time of 10 mins 24 secs compared to the Alpha machine's 12 mins 21 secs. However, there are a number of significant differences between these two systems. As well as being £200 cheaper, the Mesh system has a 9.1Gb SCSI hard disk and a SCSI CD-ROM drive, making

the input/output functions superior to Armari's. The latter's all-conquering performance relies on applications being written to take advantage of the extra processor. Out of interest, we switched off the multi-threading function in LightWave 3D and ran the tests using a single processor. On average, the times were a third longer than when using both processors. This puts a single-processor 333MHz Pentium II system well behind a 533MHz Alpha PC, so if you are not going to run multi-threaded applications you are probably better off



This picture of the Titanic was entirely created using LightWave 3D 5.0

with the Mesh. Additionally, Alpha-based systems are available in dual- and quad-processor designs which, although more expensive, are likely to knock the socks off equivalent Intel-based machines.

FX!32

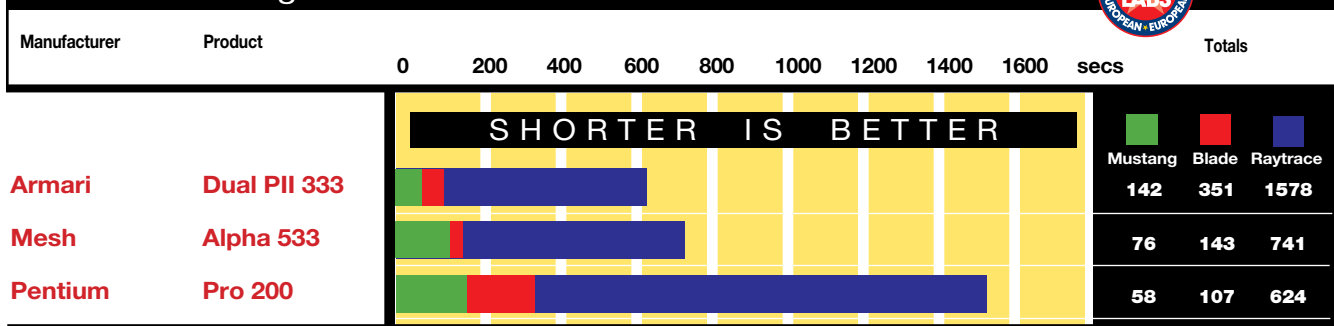
FX!32 is the key to Alpha's claims of Windows compatibility with the x86 platform. It allows transparent access to all of the Intel platform's Windows applications, and it claims to offer either equivalent or improved performance over what an Intel processor could provide. It does this by using binary translation rather than standard emulation, meaning that once the processor translates a part of the x86 application to Alpha executables, it is committed to memory and never again has to be translated.

How we did the tests

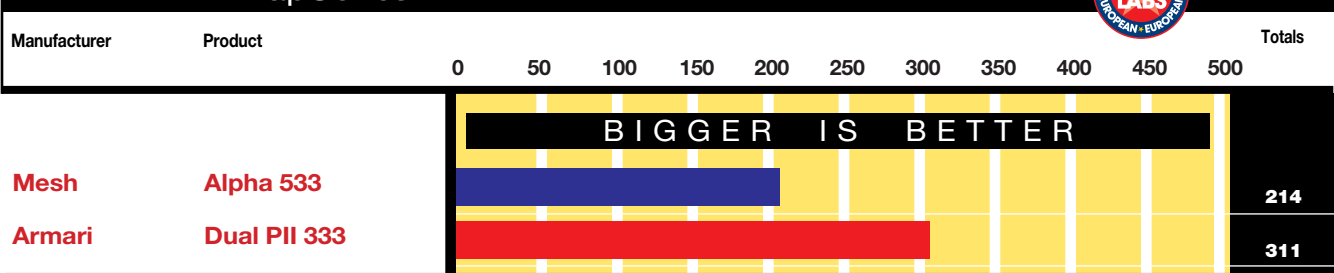
High-end systems stretch the capabilities of our standard BapCo benchmark because of their intended high-power usage: although owners will use office suites on these machines, they are generally bought for more power-hungry applications like creating 3D animations. Our policy is to use only benchmarks which make sense in the real world, so we turned to NewTek's LightWave 3D 5.0, a leading 3D animation package <www.newtek.com>. LightWave has been used in films and TV shows, including Men in Black and Tomorrow Never Dies. There are versions of LightWave 3D for both Alpha- and Intel-based systems of up to four processors, keeping the playing field level for a meaningful comparison.

We developed the LightWave 3D test together with amgFX, a leading 3D animation studio. As well as a number of other projects, amgFX is currently working on special effects for the forthcoming film, Lost in Space. We measured the time taken to render three scenes of varying complexity: Mustang, Blade and Raytrace. As a baseline for comparison, we also ran the tests on a Pentium Pro 200-based machine.

LightWave 5.0 tests



BapCo test



anti-

anti-VIR



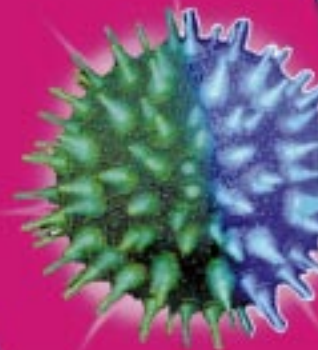
software



quick nurse
use this!



V
NURSE
U
S



BUGS



Doctor's orders

If you don't protect your PC from infection by a computer virus, you risk finding out the hard way how much damage it has done. Julian Moss prescribes anti-virus software.

Computer viruses are a fact of life. There are still a few foolhardy folk who don't use virus protection and claim never to have had a virus, but most users have encountered a virus at some time or know someone who has.

If you don't protect your PC, the only way you'll find out if it has a virus is the hard way. The most common viruses are common because they conceal their presence until they have spread elsewhere. Anti-virus software is the only tool that can detect a virus before it does any damage.

If you're in the market for a virus protector, several companies will be glad to take your money. But deciding which product is best isn't easy. How effective a package is at stopping viruses isn't something you can readily test. If it's no good, you won't find out until it's too late, so test results should be an important factor in your decision.

The number of viruses a product detects shouldn't be the only thing you consider. How easy the software is to use is important, because if it isn't easy you won't use it as often as you should. Price is an important factor, too. Anti-virus software is a solution to a problem we'd all rather not have, and you don't want to pay much money for it. The best buy for most people will be a mid-priced product with a balance between features and performance.

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Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

What is a virus?

Computer viruses are programs that do nothing useful, but just copy themselves from one computer to another. The way they multiply is similar to the way biological viruses spread. Since computer viruses are about as welcome on a PC as a dose of flu is to its owner, the biological analogy is apt.

Computer viruses can be created using just about any programming language. Most of the earliest viruses were written in assembly language, which helped them to be small and hard to detect. There were a few attempts to write viruses in high-level languages like C, but these viruses were large, obvious and not very successful. More recently, viruses written in the Visual Basic macro language used by Microsoft Office applications have appeared. These have reached epidemic proportions due to both the popularity of the Office software and the ease with which such viruses can be written.

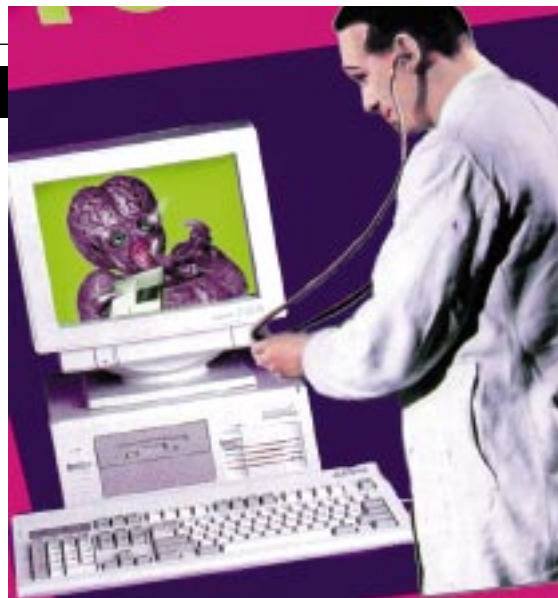
Some people write viruses for the kudos it brings: in the computer underground hacker culture it's cool to have written a virus. However, most of the thousands of different viruses are no more than modifications to existing viruses made by wannabee virus writers who lack the skills to create originals. These viruses find their way to the researchers employed by anti-virus software companies, who make sure their products can detect them. But most never spread into the wild where they could become a threat to ordinary people's PCs.

Viruses can be carried by any means used to convey data or programs from one computer to another. This used to be exclusively floppy disks. The advent of computer networks made it easier for viruses to spread; now, thanks to the internet, a virus can travel from one side of the world to the other in seconds and you can download one without realising it.

The first PC virus was reputedly written as a form of vengeance against pirates who copied software illegally. Viruses have to infect executable files — programs and disk boot sectors — to have their code executed and made active, so those who swapped programs and disks were doing exactly what was needed to help viruses to spread.

Business users were relatively immune. However, this has all changed with the advent of macro viruses. Business users exchange word-processor documents and spreadsheets with colleagues all the time, and now these files can carry viruses. No PC user can now consider themselves safe.

There are things you can do, like activating the boot sector protection in your PC's BIOS or always saving Word files in macro-free rich text format, that make it harder for viruses to spread. But anti-virus software is the only reliable form of defence. It lets you get on with whatever you bought the computer for without having to even think about viruses.



The latest products check every file automatically when you open, copy or save it, so you don't need to check them yourself. When a virus arrives in an email attachment most scanners will detect it the moment it is saved to disk.

If the worst happens and your PC gets infected, anti-virus software will help with the recovery. Rescue-disk tools let you back up key system files so they can easily be restored after a virus attack. Repair wizards walk you through the steps to disinfection so you don't need to call in an expert. Several products include boot disks to ensure the virus-free environment essential for a successful clean-up.

Virus types

The lexicon of computer virology has as many strange terms as medical science. These terms may baffle the uninitiated but they describe to those in the know the way different viruses work.

A common type of virus is the **parasitic virus**. This is so named because it attaches itself to the back of a program file like a parasite, making a small change at the beginning so that whenever the program is run, the virus code is also executed. Most parasitic viruses infect the DOS environment because writing a virus that works effectively under Windows is difficult. So, as the use of DOS is dying out, parasitic viruses are becoming less common.

Boot sector and partition table viruses infect the boot and partition sectors of disks. These sectors contain program code that the PC runs when it boots up. By occupying the boot sector, a virus can ensure that it is active from the moment you start your PC.

Boot sector viruses are commonly spread in the boot sectors of floppy disks. They copy themselves to the hard disk when you accidentally boot from an infected floppy. Any floppy disk, not just those formatted as DOS boot disks, may carry a boot sector virus.

As people make more use of networks to exchange files, floppies are not such an effective virus carrier. Consequently, many

boot sector viruses are multipartite. This means they infect boot sectors to get activated at start-up but are parasitic on files in order to spread more rapidly.

The most common viruses are those that don't make themselves obvious to the computer user. They hide, infecting other files and disks at every opportunity, and only do something noticeable, called the payload, after they have had time to spread. Payloads are often triggered by dates (Friday 13th) or by a count of the number of infections.

Stealth viruses are so called because they make themselves invisible by providing false information about things like the size of a file or the contents of a boot sector. This fools you or a virus checker into thinking nothing has changed. Anti-virus software can use anti-stealth techniques to reveal the deception. The other recourse is to boot an infected PC from a virus-free DOS disk before doing a check. This makes sure that no virus is running.

Many viruses try to evade detection by being polymorphic. This means that the virus code is variably encrypted so that no two samples out of thousands of examples of the virus look exactly the same.

Encryption makes life difficult for simple virus detectors that use pattern matching to recognise viruses. They either miss many samples or look for a short pattern that isn't

unique to the virus and results in false alarms. Leading anti-virus vendors have developed techniques that allow a virus to run in protected memory so that it decrypts itself and can then be accurately identified.

Macro viruses are the newest form of computer virus and now the most common type. They exploit the fact that executable code can be attached to documents as macros which are run whenever the document is loaded. Macro viruses mostly affect Microsoft Word. They work by infecting the default document template NORMAL.DOT, which is loaded whenever Word starts up. Once loaded, the virus macros are automatically included in each new document.

Word documents are frequently sent to their recipients by email rather than printed out. If no virus protection is used, they can spread like wildfire. As soon as the recipient opens the document, their copy of Word is infected, and any new documents they create will also contain the virus.

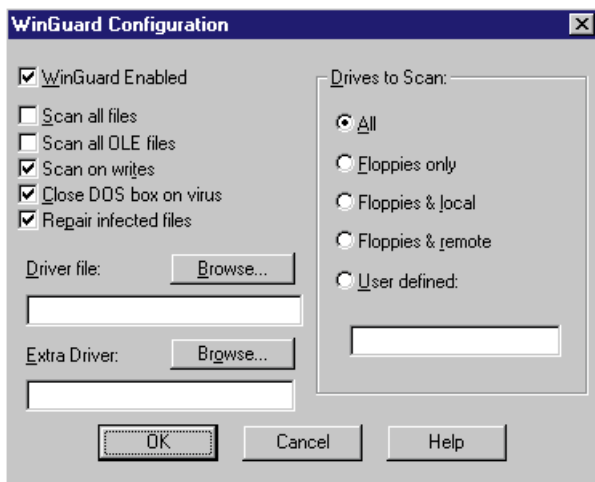
If you have email and use MS Word it is essential that you use on-access protection that can detect the virus before you open the mail attachment. Relying on periodic virus scans just isn't good enough. All anti-virus products provide on-access protection but not all are effective at stopping macro viruses, a point it is wise to check.

Personal Computer World
Highly Commended

Dr. Solomon's HomeGuard

HomeGuard is a cheaper version of Dr. Solomon's Anti-Virus Toolkit aimed at the home PC user. You don't get the same voluminous documentation and you are only entitled to one free update. More significantly, you only get the on-access scanner WinGuard, not the on-demand version, so you can't check files before running them. However, you do get the DOS-based Magic Bullet disk that can be used to clean up any PC, even one that doesn't have HomeGuard installed.

Since there's no on-demand scanner there's no scheduler either. In fact, there's virtually no user interface at all. WinGuard loads at start-up and gets on with its job quietly, popping up a warning box with a picture of a squashed bug on it each time it finds and removes a virus. The recommended option, chosen during installation, is to have WinGuard clean infected files automatically. If you choose that option you can just install it and forget about it.



WinGuard has no user interface, just this configuration dialog box

There is a user interface, but it is minimal. A small dialog box tells you how many viruses the program can detect and the state of the current settings. You can change the list of file types scanned, turn on heuristics to improve the recognition of unknown viruses, customise warning messages and enable logging. An inconvenience is that you must restart Windows after changing any of these settings before they take effect, something other products don't seem to require.

By default, WinGuard doesn't check files as they are written to disk. This means that if you extract a file from an email attachment or a ZIP file downloaded from the internet, you won't know it's infected until you try to load or run it. Although WinGuard catches the virus in the end and disinfects the file on the fly, it's a bit alarming to receive the warning at the last moment.

WinGuard doesn't use integrity checking, nor does it watch for virus-like activity: it relies on its strength at virus identification. And it's good, very good, but not as good as F-Secure Anti-Virus. But as Dr. Solomon's doesn't provide updates online you'll have to pay for extra updates on disk to keep it that way.

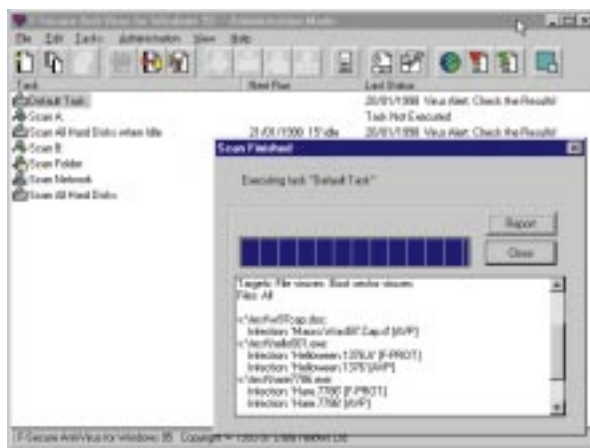
PCW Details

Price £29 (£24.68 ex VAT)
Contact Dr. Solomon's 01296 318700
www.drsolomon.com
Good Points Top-class detection. Simple to use.
Bad Points No on-demand scanner. No online updating.
Conclusion A fit-and-forget solution to rely on.
 ★★★★★

F-Secure Anti-Virus 4.0 for Windows 95

F-Secure Anti-Virus is an unusual product. Developed by Data Fellows in Finland, it boasts two separate scanning engines: F-Prot from Frisk Software and AVP. The use of two scanning engines might seem unnecessary but it brings several unique benefits. First, one scanner may detect an infection that the other might miss, so there's less chance for a virus to creep in unseen. Second, any question of false alarms is eliminated if both scanners report the same virus. The downside is speed: two scans take longer than one and this was the slowest product we tested. However, scans can be scheduled to run while the system is idle so users needn't be inconvenienced.

F-Secure's interface lets you define tasks such as to scan a particular drive or folder. The program doesn't add menu options to let you scan from Explorer, but you can drag from Explorer to the scanner window to start a check. You can choose what file types to scan and what action to take if a virus is



Dual scanning engines give confirmation of most infections and pick up others that one alone might miss

found: the program will report, rename, disinfect or delete it. Logging is detailed and shows which scan engine reported a virus so you can see immediately if you have a positive, dual identification. Other options let administrators manage and update copies of F-Secure on network workstations.

Any doubts about the product's approach are dispelled by the results, which are outstanding. There were no false alarms and just one rare virus sample was missed,

making this the top scorer of the ten products tested. Macro virus detection in particular is helped by the AVP scanner, which spotted infections that the F-Prot engine failed to catch.

F-Secure includes on-access protection called Gatekeeper. It checks files when they are opened, run or copied but not when they are written, so files extracted from ZIP archives or mail attachments aren't instantly flagged as infected. We couldn't test Gatekeeper on the entire virus collection as it always displays a warning, in fact two warnings: one a blue text mode screen, the other a Windows message box. However, we didn't find any viruses it missed, and most it offered to disinfect on the fly.

PCW Details

Price £109.27 (£93 ex VAT) including quarterly updates on disk.
Contact Portcullis Computer Security 0181 868 0098 www.portcullis-security.com
Good Points Outstanding detection rate. Positive virus confirmation.
Bad Points Slow scanner.
Conclusion Best anti-virus software you can buy.
 ★★★★★

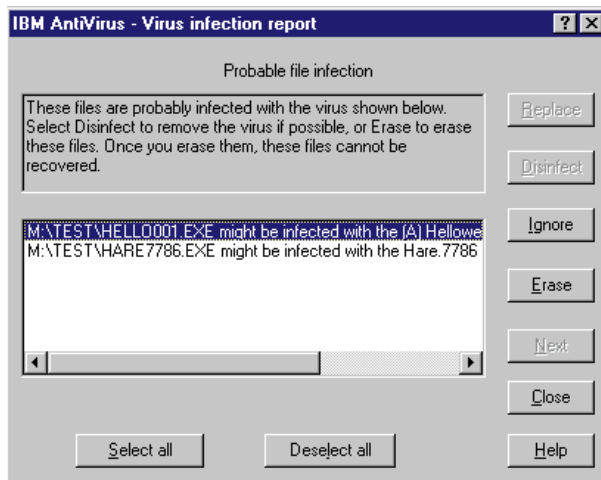
Personal Computer World
Highly Commended

IBM AntiVirus 3.0

IBM AntiVirus has a simple user interface, though not one that will win any awards for looks. To check your system, click the one and only button. To check specific folders, you must use the menu to access some rather messy dialog boxes. To scan your CD-ROM drive you must somewhat unintuitively choose Check diskettes. No Explorer context menu items are added, so you can't start a scan without launching the scanner first.

The program gives you the standard option of whether to check all files or just executables. You can also choose whether files inside ZIP archives should be checked. Those are the only options you get for the on-demand scanner, although there is a simple scheduler to run a daily automated check.

IBM's scanner uses a combination of integrity checking and scanning. The first time it sees a file it carries out a full virus check. If the file is clean, the scanner stores information



Disinfection isn't an option for many viruses

about it which allows it to tell if the file has been modified or not. Files are only re-scanned if they change (or when you update the product with new virus information) so normal daily scans are fast.

The detection rate is pretty good: a whisker behind Norton and McAfee, although it did miss the Word 97 macro virus called Cap. However, the repair capability is poor. IBM AntiVirus won't disinfect files that others

clean successfully.

The other weak point is the real-time component, System Shield. It only detects what IBM has decided are common viruses. An uncommon virus could still infect the system, so regular runs of the on-demand scanner are essential to ensure your PC really is virus-free. There's no automatic disinfection on access either. By default, files are only checked when opened or run, although this can easily be changed if you want mail attachments and ZIP-file contents to be checked on extraction.

On the plus side, IBM has used its PC-DOS licence to provide a bootable clean-up disk. This makes it easy to clean a PC that is badly infected.

PCW Details

Price £39 (£33.19 ex VAT)

Contact IBM 01329 242728 www.ibm.com, www.av.ibm.com

Good Points Fast scanner. Free virus updates from the web.

Bad Points Poor on-access detection. No automatic disinfection.

Conclusion Needs development to remain competitive.

★★★

InocuLAN AntiVirus 5.0

InocuLAN AntiVirus (IAV) from backup software specialist Cheyenne is a relative newcomer to the UK market. The software contains both on-demand and on-access scanners. The on-demand scanner interface is similar to Norton's and simple to use, letting you check whole drives or folders with a couple of mouse clicks and selected files from the menu. Options added to Explorer menus let you check folders or drives without first launching the scanner application.

On installation you are invited to register online and download virus updates — a straightforward process. However, the update was over 4Mb and required a re-run of the Setup routine afterwards. On completion IAV scans your hard disk, then creates a rescue disk with copies of your key system files on the blank floppy provided.

The initial scan is slow because the default setting is to scan all files including things never



InocuLAN's main window is similar to Norton's

likely to conceal a virus. By opting to check only program files, scanning runs much faster. There are three scan options: Quick Scan, Thorough Scan and the intriguingly named Reviewer Scan. As with Sophos Sweep, the default is Quick.

IAV has a good range of configuration options, though fewer than Norton AntiVirus. You can scan inside compressed archive files,

but there's no integrity check comparable to NAV's inoculation and no virus-like activity monitor either. Logging is flexible, but the log can only be viewed in a tiny non-resizable window: you can't print it, nor is it stored in a format that can be opened in a text editor.

IAV's scanner missed an in-the-wild Windows 95 virus, Anxiety, and some Word 97 macro viruses. It missed 19 other rare virus samples too. This isn't unforgivably bad. However, IAV also raised two false alarms when checking our collection of harmless utilities. This makes it highly probable that buyers will experience false alarms themselves, causing unnecessary panic.

The on-access scanner performs on a par with the on-demand version. It detected the infected Word document in a mail attachment immediately on extraction, displaying a Cleaning Wizard that let us disinfect the file.

PCW Details

Price £39 (£33.19 ex VAT)

Contact Cheyenne 01737 775500 www.cheyenne.com

Good Points Easy to use. 12 free online updates.

Bad Points False alarms.

Conclusion An average performer.

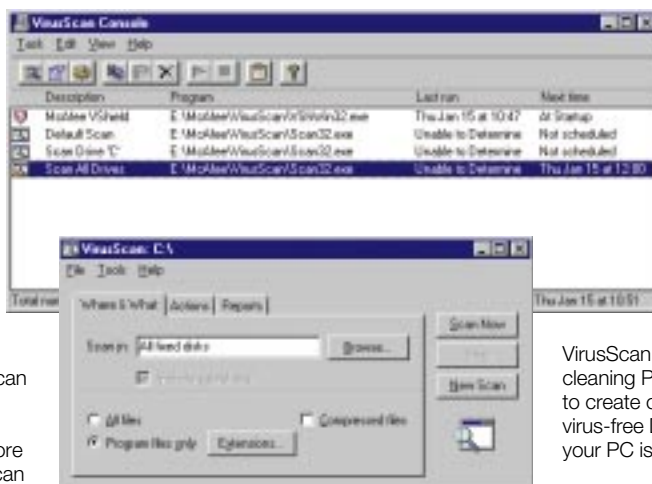
★★★

McAfee VirusScan

VirusScan is one of the oldest-established anti-virus products. It is available in several versions, shareware and retail, with and without disk-based updates, for all Windows platforms, DOS and OS/2. Updates can be downloaded from the web or a bulletin board, though to get access to software upgrades (which may be needed to be able to detect some new viruses) you need a password which is only sent to you after registration.

The on-demand scanner VirusScan has an interface that looks a bit like Windows 95's Find tool. There's an optional Advanced interface with more configuration options, and a VirusScan Console that incorporates a scheduler and lets you set up scans to run on demand or at set times. A Scan for Viruses option added to the context menu lets you scan folders directly from Explorer. There's also a ScreenScan utility that checks your disks while your screensaver runs. No other product offers quite so many different ways to use it.

VirusScan includes an on-access scanner, VShield. It can check files when they are run, copied, created and renamed, and floppies on access and system shutdown. You can choose whether to scan all files or just



programs (including potential macro virus carriers) and pick from a range of actions to perform when a virus is found. VShield can prompt you for what to do or can clean, rename or delete the file automatically.

VirusScan's detection rate is good, on a par with its main competitor, Norton, though not as good as F-Secure or HomeGuard. It did, however, miss one in-the-wild virus, the Windows 95 Anxiety virus. The on-access scanner yielded identical performance, and detects infected files as soon as you run or

Top The VirusScan Console lets you set up scan jobs to run at predetermined times
Below VirusScan's simple interface is modelled on Windows 95's Find tool

open them. In the case of mail attachments or the contents of Zip archives, you are warned as soon as you try to extract the files, unless you change some of the default settings.

One thing lacking from VirusScan is a ready-to-use boot disk for cleaning PCs. During setup you are prompted to create one, but you must provide your own virus-free DOS system disk, which is hard if your PC is already infected.

PCW Details

Price £29 (£24.68 ex VAT)

Contact McAfee 0171 616 5800

www.mcafee.com

Good Points Good detection rates. Inexpensive.

Bad Points No ready-to-use boot disk.

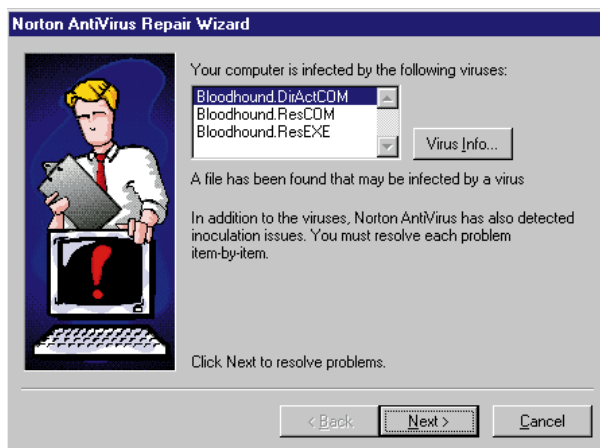
Conclusion A good choice.

★★★★

Norton AntiVirus 4.0

Symantec released new versions of Norton AntiVirus (NAV) for all Windows platforms and DOS towards the end of last year. All versions now share a common user interface. The on-demand scanner is easy to use: you choose which drives to check and click Scan Now. Menu options let you check folders and even individual files. You can also run checks from Explorer context menus. If a virus is found, a Repair Wizard makes removing it easy. NAV includes a clean-up boot disk to use when your system files are infected.

NAV's on-access checker, Auto-Protect, is very effective, although it missed a couple of rare viruses that the on-demand scanner would have found. When an infected file is accessed you see a blue text mode screen with a range of options including one to repair the file where possible. When an infected document is received by email it is detected and repaired as soon as it is extracted from the message.



Norton's Repair Wizard guides you through the process of disinfecting a machine

NAV's configuration options contain nine pages of settings that let you tailor the program to work the way you want. You can choose to have it check inside compressed files like ZIP archives and pick what choices it should offer when a virus is found. You can also choose whether to use inoculation, Norton's name for integrity checking, which allows NAV to tell if a file has been modified by an unknown virus.

AutoProtect can check files when run,

opened, copied, moved, created or downloaded. Even with all these checks enabled, performance isn't noticeably degraded. AutoProtect can also watch for virus-like activities like attempts to format the hard disk, write to boot records, write to program files and change read-only attributes. This is useful extra protection that other products don't offer.

NAV's detection rate is first-rate, missing just a handful of rare samples never found in the wild. It's easy to keep up-to-date, too, with free online updates for the life of the product. One click on the LiveUpdate button downloads the latest virus information over the internet and the updates aren't large, taking just a few minutes.

PCW Details

Price £49 (£41.70 ex VAT)

Contact Symantec 0171 616 5800

www.symantec.com

Good Points Excellent protection. Easily updated.

Bad Points Disk-based updates expensive.

Conclusion Best combination of features, ease of use and performance.

★★★★★

Personal Computer World
Editor's Choice

Touchstone PC-cillin II

If anti-virus products won awards for their user interface, PC-cillin II would be one of the leading contenders. It's certainly the most attractive looking. The main window has several tabs from which you can select drives and folders to scan, view a list of infected files found and clean them, or browse information about viruses. The on-access scanner also has an optional status window with meters and indicators showing what it is doing.

PC-cillin is tightly integrated with the internet. There's a built-in browser called the Internet Virus Lab which takes you to the PC-cillin section of TouchStone's web site. The Virus Doctor feature lets you upload unrepairable files to TouchStone: check back later and if the file is cleanable you can download the repaired version.



A built-in web browser lets you access virus information and download updates

The Update Pattern page lets you install virus updates from the internet, floppy disk or TouchStone's US-based BBS. Updates are only free for 90 days after which you must subscribe online or by fax using your credit card. However, we were able to use the Virus Lab browser to download a 500Kb update file from the free area of the web site which we then copied to floppy and installed as a disk-

based update. This is just as well, as the virus patterns on the CD-ROM in the retail package were several months out of date.

Even with the update installed, PC-cillin is a second-rate performer. It missed two in-the-wild Word 97 macro viruses plus Win95 Anxiety, which is not unforgivably bad. It failed to detect a greater number of rare viruses than any other product except VET and VDS Pro, and also generated one false alarm.

PC-cillin's on-access monitor doesn't prevent accesses to infected files. If it detects a virus, a window appears offering the chance to clean the file, but by then the virus could be active. To protect your Word document templates a separate macro shield is installed into Microsoft Word which does intercept infected documents and allow them to be cleaned before loading.

PCW Details

Price £30 (£25.53 ex VAT)

Contact TouchStone 0181 875 4441

www.checkit.com

Good Points Nice interface. Good net integration.

Bad Points Below-average detection rate. Limited free updates.

Conclusion Not as good as it looks.

★★★

Sophos Anti-Virus for DOS/Windows 95

Sophos Anti-Virus is the product formerly known as Sweep. The name change reflects the fact that the package now has an on-access component called InterCheck as well as Sweep, the on-demand scanner.

Sweep's user interface is pretty simple. There are two main options selectable using tabs. One lets you run a virus scan immediately, the other lets you schedule scans to run at set times. To use the scheduler Sweep must be running minimised where it occupies a Task Bar button and consumes a fair amount of memory. A separate scheduler would be better.

To start a scan you select a target from the list — new targets like network drives or folders can easily be added — and then press the green Go button. The scanner isn't especially fast, but a progress bar is displayed and the results of the scan shown in a panel at the foot of the window.

Sweep offers a range of actions for disposing of file viruses, but only document files and boot sectors will be repaired. Sophos maintains that the only guaranteed way to remove parasitic viruses is to restore an uninfected copy of the file from a backup. While this is true (many of the programs



"repaired" by other products don't work afterwards) many users might still prefer to try a repair, especially if they don't have a copy of the original.

Sweep's scanner is pretty good, but not top class. It failed to catch two in-the-wild viruses: Win95 Anxiety which several products missed, and Spanska.4250. Sweep didn't do so well with viruses that aren't in the wild,

From Sweep's main window you can run immediate or scheduled scans

however, putting it fifth overall. Using the Full sweep level not the default halved the number of viruses missed and only Spanska of the in-the-wild viruses remained undetected.

Sophos' approach to on-access checking is somewhat different than that of other vendors. InterCheck records whenever a file has been checked and if it hasn't, it uses Sweep to check it. In a network environment the copy of Sweep can be on a separate InterCheck server, which reduces the workstation memory overhead. On a standalone PC a local copy is used. This makes on-access detection as effective as on-demand, but there's no automatic disinfection.

PCW Details

Price £116.33 (£99 ex VAT)

Contact Sophos 01235 559933

www.sophos.com

Good Points Good detection rate.

Bad Points No on-access disinfection. No file virus repair. Expensive.

Conclusion Good, but pricey.

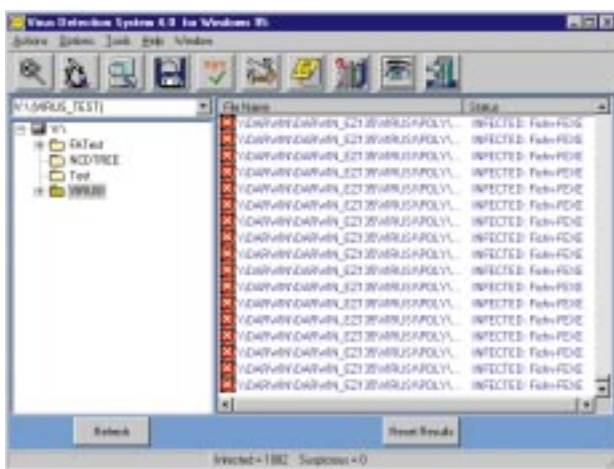
★★★★

Finson VDS Pro for Windows 95

VDS Pro is the cheapest Windows 95 anti-virus product you can buy. It's also proof that you get what you pay for. In this case you get a program with some of the most poorly designed buttons and icons imaginable, and a main window that for some unfathomable reason is blue. Oversights like the program trying to write its log file to the default path on C: even though the software was installed somewhere else don't inspire confidence.

There is also doubt about how well its users are supported. Although free online updates are promised, none have ever appeared on Finson's web site.

The two-pane interface shows a list of drives and folders on the left and the results of scanning on the right. However, you can't scan more than one drive or folder at a time. A few simple configuration options let you choose what to scan and what you want VDS Pro to do if it finds a virus.



Virus detection performance fails to live up to the promise of the user interface

VDS Pro uses both signature-based scanning and integrity checking. On installation the hard disk is checked for viruses and then an integrity database is created so that any subsequent changes to files can be detected. The program failed to notice that the test system had several drives and only checked and made a database for drive C:.

The integrity check is needed because the scanner performance is appalling, showing

that signature-based scanning just isn't good enough. The program missed several macro viruses. It also failed to detect Hare, Maltese Amoeba, Tequila and Natas, all common polymorphic viruses, plus Flip and Win95 Anxiety. The number of rare viruses missed was the worst of the products tested. Enabling the heuristic option improved the detection rate but only by a bit, and the files caught by the heuristics appear in the list with no explanation. VDS Pro caused the most false alarms: three without heuristics and seven with.

The background component of VDS Pro isn't a true on-access scanner. It checks disk boot sectors on access and checks memory for known viruses on program loading. It doesn't stop you from copying viruses, and it won't stop you loading documents infected with macro viruses at all.

PCW Details

Price £20 (£17.02 ex VAT)

Contact Finson 0171 723 4003

www.finson.com/UK/

Good Points Cheap.

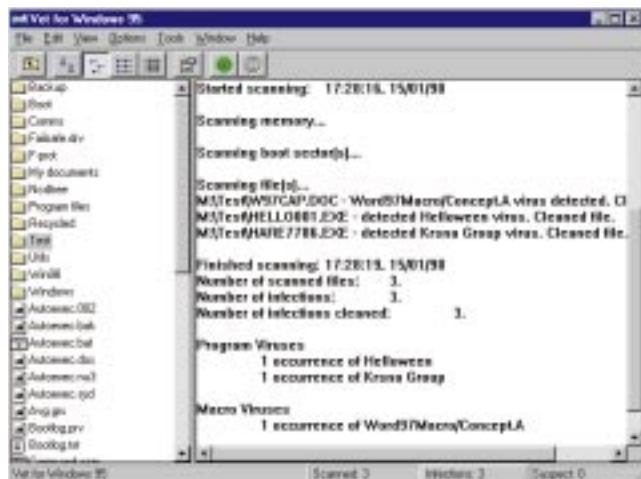
Bad Points Terrible detection rate. Many false alarms. No updates.

Conclusion Dreadful.



VET 9.6 for Windows 95

VET is an anti-virus product from Australia and available for DOS and all Windows platforms. The Windows 95 version has a two-pane interface in which one pane shows an Explorer-like view of the disk being examined and the other shows the results of the virus scan. To run a check you select the drives or folders you want and press a button marked Go. The program adds VET options to Explorer context menus so you can run checks directly from Windows Explorer.



VET's user interface is loosely modelled on Windows Explorer

VET has a couple of unusual features. Auto-scan checks a specified number of files each time Windows is started so that the whole drive is checked without the impact of a full scan every day. And if a virus is found, VET can send an email notification to any internet email address via any SMTP mail server.

VET's scanner is very fast. Unfortunately, it isn't very good. Even with the Full Scan option enabled (the most thorough) VET detected only 88 percent of our virus samples. Many, admittedly, were viruses not found in the wild. However, the worst showing was in the detection of polymorphic (variably encrypted) viruses. VET failed to detect one sample of the easy-to-spot Maltese Amoeba and all but a handful of the more difficult Natas virus. This suggests that the software uses inadequate pattern-matching detection methods rather than

the in-memory decryption which more technically advanced products employ.

It wasn't possible to exhaustively test how effective the on-access scanner is as there was no setting that didn't require manual intervention for each infected file. However, the on-access detection fails to detect infections in files on a network drive. VET successfully repaired several infected files, but then when we extracted a Concept-infected Word file from a mail attachment it was damaged so badly after "repair" that it locked Windows 95 solid if you so much as right-clicked on the icon.

VET's UK office claims that the version 9.6 we tested isn't the one currently on release. However, the company submitted it and it is already being sold in Australia.

PCW Details

Price £59 (£50.21 ex VAT)

Contact VET 0114 275 7501 www.vetavs.co.uk

Good Points Fast scanner. Email notification of infections.

Bad Points Poor detection rate. Flawed on-access detection.

Conclusion Not recommended.





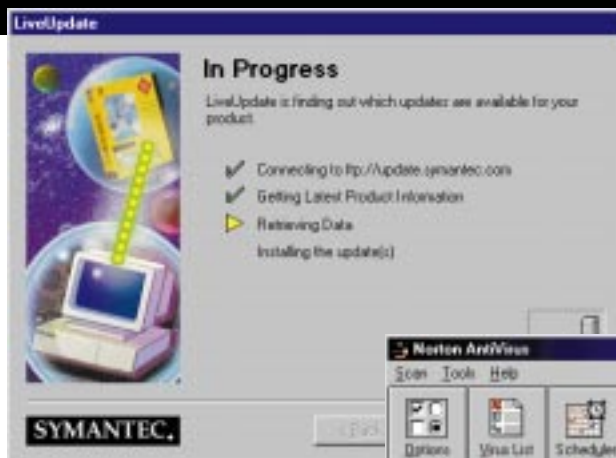
Editor's Choice

Anti-virus software is almost unique in that it is one of the few classes of software that can be evaluated quantitatively. However, one shouldn't get too carried away by test results. Only a few hundred of the 15,000 or so known PC viruses are actually "in the wild" and present a significant danger to your data. Differences in the number of rare (in other words, not in the wild) viruses detected certainly reflect on the quality of the R&D that has gone into the software. But the ability to spot viruses you're never likely to encounter isn't going to make your PC safer.

For this reason we award **Editor's Choice** to **Norton Anti-Virus 4.0**. Although not the top-rated product in terms of virus detection (in fact, it came third) it is ahead of the rest in every other respect. It is easy to use, both every day and when you need to clean up an infected file. It is highly configurable, with several optional weapons in its armoury including inoculation and activity monitoring, providing extra protection if you need it.

Norton's on-access protection works well, disinfecting files on-the-fly at the click of a key. And most importantly, it is easy to keep up to date, with free updates for the life of the product. A click on the Live Update button is all you need to download the latest virus data files and install them. Few vendors have gone to such trouble to make updating so easy.

Highly Commended is the new **F-Secure Anti-Virus 4.0** for its outstanding virus-detection performance. Unique in using two scanning engines, it detects more viruses than



Left The Norton AntiVirus LiveUpdate downloads virus updates over the net and installs them automatically
Below The interface is simple and uncluttered

any other product and removes any doubt that what it finds may not be a virus by giving two separate confirmations. With an automatic online update facility and a more end-user-friendly price, this could have been **Editor's Choice**. As it is, UK distributor Portcullis prefers to sell to corporates for whom, with its built-in administrator functions, it is the perfect solution.

Also **Highly Commended** is **Dr. Solomon's HomeGuard**. This is the best solution for the user who wants to be protected from viruses but prefers to know as little as possible about them. Security is first class and the software needs no effort to use. For a great many people this is all they need: simple, reliable, effective virus protection.



Bear in mind that anti-virus software could cause conflicts or crashes on some systems or configurations. At PCW we use Dr. Solomon's WinGuard 7.77 which has occasionally crashed certain PCs when closing Microsoft Word 95 documents.

Protecting network servers

Files on a network server could be accessed by any computer on the network. If a file became infected by a virus, the virus would quickly spread. So it is important for network servers to be protected.

Server disk volumes can be checked for viruses using the same software used to check workstations. If the volumes can be accessed as drives under DOS they can be scanned with an ordinary on-demand scanner. This isn't an efficient way of doing it, though. If you scan from a separate workstation you are using resources on the workstation and also the network, as files must be sent over the network to be scanned. If you scan from a DOS session on the server itself — not always possible — you will use server resources which could perhaps be put to better use.

The best way to protect network servers is to use scanners written specifically for that job. On the most popular servers the software is installed as a NetWare loadable module (NLM) or Windows NT service, and may be controlled from a management console running on the server or a workstation.

Server-based anti-virus software may work in one of two ways. One method is to sweep the server volumes at intervals. This may seem as much of a waste of resources as

scanning from a DOS session, but the software can detect when the server is busy so it will only run during times when it would otherwise be idle.

The other method is to check files as they are written to disk or read by a client, in much the same way as an on-access scanner on a workstation. This obviously slows file access by a small amount. The effect may not be noticeable, as it isn't on a workstation, but on a heavily-used server the cumulative effect could be enough to reduce performance. The advantage is that there is no between-scan interval during which an infected file could reside unchecked on the server.

Network anti-virus products are available from all the major anti-virus vendors. Products like Dr. Solomon's Anti-Virus Toolkit Server and Norton Anti-Virus for Networks cover the most popular network operating systems, Novell NetWare and Windows NT. Sophos even markets a version of Sweep for Banyan Vines. Its client-server approach means that just about any type of file server can be protected using a copy of Sweep for DOS as the scanning engine.

Although it's not essential, it makes sense to use the same anti-virus package on both clients and servers. The two can co-operate so when a file is checked on the workstation it

isn't checked again on the server. When a client detects a virus it can inform the server which maintains a central log of events. A client may even automatically ship a copy of the infected file to a quarantine directory on the server for action by the administrator.

Another benefit of going for a one-vendor solution is that most network anti-virus products include tools to manage the software on the clients. The software on every workstation must be regularly updated to maintain its ability to detect new viruses. This would be a tiresome job without tools to do it.

Although it's important to check that files on network file servers are clean, these aren't the only servers that need protecting. The use of email and the ability of network users to browse the internet provides new ways for viruses to enter the system, and specialised products are required to stop them.

Products like Dr. Solomon's MailGuard can catch email-borne viruses at the mail server, while Integralis' MIMESweeper claims to eliminate threats not just from email but from ftp and web downloads. These products aren't cheap, but without them you are reliant on workstation software to catch the viruses. If you want complete protection for your network, such solutions are worth considering.




Table of features					
					
Name	Dr. Solomon's HomeGuard	F-Secure Anti-Virus for Windows 95	IBM AntiVirus	Inoculan AntiVirus for Windows 95	McAfee VirusScan
Company	Dr. Solomon's	Portcullis	IBM	Cheyenne	McAfee
Telephone	01296 318700	0181 868 0098	01329 242 728	01737 775500	01344 304730
Typical price inc. VAT	£29	£109	£39	£39	£29
MSDOS	○	●	●	○	●
Windows 3.1	●	●	●	○	●
Windows 95	●	●	●	●	●
Windows NT	○	●	●	○	●
On-demand scanner	○	●	●	●	●
On-access scanner	●	●	●	●	●
Disinfect on access	●	●	○	●	●
Emergency boot disk	●	○	●	○	○
Scheduler	○	●	●	●	●
Disk updates included	1	4	1	0	0
Online updates	○	●	●	●	●
Overall detection:	99.7%	99.9%	99.5%	98.7%	99.6%
False alarms:	0	0	0	2	0

Table of features					
					
Name	Norton AntiVirus 4.0	PC-cillin II	Sophos Anti-Virus	VDS Pro	VET AntiVirus
Company	Symantec	TouchStone	Sophos	Finson	VET
Telephone	0171 616 5800	0181 875 4458	01235 559933	0171 723 4003	0114 275 7501
Typical price inc. VAT	£49	£30	£116	£20	£79
MS-DOS	●	●	●	●	●
Windows 3.1	●	●	○	○	●
Windows 95	●	●	●	●	●
Windows NT	●	○	●	○	●
On-demand scanner	●	●	●	●	●
On-access scanner	●	●	●	●	●
Disinfect on access	●	●	○	○	●
Emergency boot disk	●	○	○	○	○
Scheduler	●	○	●	●	○
Disk updates included	0	0	0	0	0
Online updates	●	●	●	●	●
Overall detection:	99.6%	98.3%	99.0%	68.0%	88.0%
False alarms:	0	1	0	3	0

Key: ● Yes ○ No



Collector's **item**

What would an exhibit lose and gain in being displayed on a PC rather than in an actual gallery or museum? John Rennie looks at this new aspect of the virtual world.

Time was when museums were dry, dusty places staffed by grim-faced, uniformed attendants. However, the Science Museum, in London's Kensington, was always the honourable exception: there were buttons you could press to make the exhibits actually work, machines that you could operate. Interactivity may have entered the currency of computerspeak in the nineties, but someone down at Exhibition Road had figured out the concept several decades before: if you can get people playing with the exhibits and they have fun, they learn something.

At the Natural History Museum, galleries and museums are big, static displays full of large, fragile artefacts of value. How do you build interactivity into that setup? The clue lies in a quote from museum professional David Bearman's online paper "Museum Strategies for Success on the Internet". On the subject of museum artefacts, Bearman asserts: "People do not want the things in themselves, they want the meanings they convey".

So do you need to visit the Louvre in person to evaluate and enjoy the Mona Lisa? Countering the reservations of colleagues who describe it as a "second-hand" or surrogate experience, Bearman looks at the internet and foresees a museum culture enriched by virtual visits, where people go to a gallery's web site to plan their physical trip, selecting the exhibits they wish to see, planning their route, participating in follow-up online projects and posting questions to the curators.

Meanwhile, CD-ROM, touch-responsive screens, video and multimedia encourage physical visitors to the museum to interact with the collection. For some traditionalists it may smack of the lunatics taking over the asylum, but for Bearman, this is the most exciting element: "[new technology]...enables us to respond to the visitor rather than pump information at him." The visitors are taking control of the museum.

Initially, the impact of IT was in applying new technology to existing collections: the shape and layout of the

ILLUSTRATION by Lucy Bristow

museum didn't change, but the flexibility and swift access of interactive multimedia meant that curators could offer their visitors new ways of looking at the collection.

The Micro Gallery

One of the earliest experiments in interactive display was the Micro Gallery at the National Gallery in London's Trafalgar Square. The brief had been to allow visitors to plan a personal tour of the gallery's 2,200 paintings. The system demanded large, high-quality renderings of full-colour pictures, at high resolution. There would also be more than 1,000 secondary illustrations, dozens of animations and 300,000 words of supporting text. It had to be usable by visitors with no computer experience, and it had to allow users to move from screen to screen in less than a second. Project manager Martin Ellis settled on twelve Mac IIx stations, each with 8Mb RAM, connected to its own dedicated 1.3Gb drive and linked via a LAN to a Mac administrator.

Before starting your trip around the gallery you'd sit in front of a colour monitor and plan your route via the instructions on the Ellinor touch-screen. But isn't looking at paintings on a computer screen a poor substitute for the actual experience of standing before the work? It's not meant to be, explains Rachel King, the Micro Gallery manager. "It is intended to enhance, to add to the experience, not replace it."

The computer's "welcome" screen presents the user with four menu options: an A-Z index of all the artists in the collection, an historical atlas, a breakdown of the collection by "picture types" or genres, and a general-reference A-Z. Those who know exactly which artist they are looking for, can go direct to R for Renoir, say, where they will be presented with all his works in the gallery. Click on his *Les Parapluies* and up pops the colour image, complete with a brief background and other information (e.g. oil on canvas, size, date painted). Meanwhile, a floor plan of the gallery flashes the position of that painting in the building. Hit a screen button and it adds a thumbnail to your tour plan, highlighting the painting's position.

Once you've selected all the pictures you think you can comfortably view in the time you've allowed for your visit, your personal tour is output for you, with a list of your choices, their room numbers and positions flagged on the floor plan. And, for only £1, you can print out five screens of your choice, each with a black-and-white likeness of a painting and its background information.

"What we've done is to make it quicker and easier for people to get around the gallery and lessen the risk of them missing certain pictures," says Rachel. The system also prevents a tour of diminishing returns; you might scrutinise every picture in Room 1, skip a few in Room 2 and never actually get to Room 46. "It gives you a manageable tour."

Because the Micro Gallery offers four ways in to the collection, even someone with a sketchy knowledge of art can find the pictures in which they are interested. You could start by going to the Still Life section, which will list

all the pictures of that genre and some information about it. You might then go to the historical atlas, click on a date and region and view other paintings of the period.

All the pages have hotlinks. For instance, Picasso will be linked to Bracque, Spain, and the 20th Century. Other links are to jargon-busting boxes, explaining Cubism and so forth. It's hard to get lost yet easy to build knowledge of, or research, a given area.

Striking a balance

Although the Micro Gallery predates the presence of museums on the web, this way of working could have been a model for the way in which people now net-surf for information. It's powerful and quick. But it is precisely the cherry-picking nature of the net that fills some museum curators with dread. Used to providing a set menu for visitors, with a pre-determined collection in a prescribed order, curators now find visitors treating their virtual collections as a buffet, deciding what they fancy and leaving the rest.

The worry is that they may not be getting a balanced diet. "You have to view this way of getting information as a matrix, not a line," says Jane McCarthy, head of education at London's Museum of the Moving Image. One demand on museums, and on educators generally, is to construct ways for people to build their own museum experience, to plot their own way through a collection, in a thorough manner. "But no-one should visit a museum imagining they're going to see it all."

The changing role of the teacher

Peter Cochrane, head of advanced research at British Telecom, predicts that this will give birth to a new educational paradigm, a new relationship between teacher and pupil. "For millennia, the teacher has been the font of all knowledge to his pupils. IT will challenge that relationship. [The teacher will become]...more of a guide. Class networks will evolve with the rapid sharing of newly-discovered facilities and techniques. No books, no formalism..."

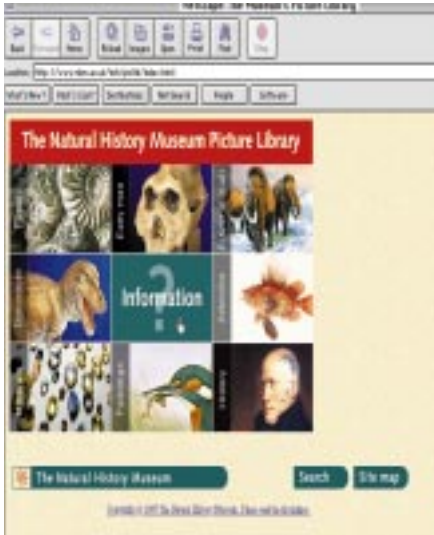
One of the problems facing the Government's white-hot IT revolution (every kid online with their own email address) is that some of these teachers may be left



Above, top

A young student uses the interactive computer screen in the Challenge of Materials gallery at the Science Museum

Above The Science Museum web site links schools' research and web sites via its STEM project



The Natural History Museum site gives access to the museum's picture library, drawing on 250 years' worth of pictures, and is broken down into specialist areas

rather than replacing it.

The museum is using the unique nature of the net to redesign the learning experience with its STEM (Students' and Teachers' Educational Materials) project. "This enables pupils to construct a web site which reflects their visit to the museum and describes the science projects they are working on," says Bazeley. So, a visit becomes far less passive than in the past. School students prepare for what they will learn, absorb the information at the museum, then reinforce that knowledge by constructing their own site. The sites are then linked into the main Science Museum site.

The museum itself has taken advantage of its position as one of the best resourced, and best sponsored, facilities in the UK to increase its interactive profile. So you'll still find the time-honoured, hand-cranked displays of the operation of a rheostat or an electromagnet, but you will also see the Capital Radio-sponsored "mix your own CD" display getting far more attention from the 11-year-old punters — I speak from experience, as I had to queue for half-an-hour to get a go! The museum sees touch-screen interactives as not only a big selling point for visitors but also as a quick, fun way of hammering

behind. "Schools are poorly resourced," says Martin Bazeley, assistant education manager at the Science Museum, "and, among other things, that can mean poorly-trained teachers."

The Science Museum was the first British museum to grasp the nettle of the net. Its site delivers a host of information about current exhibitions and research, and hosts online features and feedback. But the assumption is that the site complements the work of the physical museum,

home information. So the "Select It" section (in the Challenge of Materials gallery), which looks at choosing the optimum material for, say, an artificial hip or a contact lens, will offer you multiple choices. The program will assess the suitability of your choice for biocompatibility, toughness, transparency, ductility etc: if you choose wood, say, for your contact lens material, it responds with a loud raspberry-blowing klaxon; if you select the correct plastic, you will receive a satisfying fruit machine-like "Ching!"

Improved access

Alice Grant, head of collections at the Science Museum, sees IT as far more than an opportunity to improve the presentation of its content. For her and her team it offers the chance to link-in huge quantities of the museum's resources which would otherwise be inaccessible even to museum staff, let alone the visiting public.

Having grasped and exploited multimedia to make museums interactive and lively places of learning and entertainment, the sector now finds itself nervously anticipating the next leap into the unknown: the virtual museum. For many of those in charge of museums, the idea of virtual visits (unstructured tours, no hands-on experience of the size and texture of exhibits, no curator-designed context) is terrifying. Grant, though, sees huge possibilities for a complementary experience to actual visits, rather than being a substitute. The Science Museum has learned works and academic papers by the thousand, and these are an invaluable resource for visitors dipping into the museum or its website for research purposes. The challenge for Grant is getting this content online and making it browsable.

"We can use the museum's web site as a base, but we want to develop it into a more cohesive thing, linking in-house content with external papers." At present, that means the development of an in-house intranet for staff use, with limited public access at the museum's information point. This alone is no small task, with an NT platform linking 150 users over five sites.

Grant's two focal points concern content and access:

Museums and libraries into the future

The World Wide Web Virtual Library is a unique resource. It acts as a linking site to museums around the world, with a list of libraries by subject. It is an online library for features about the status and future of museums and libraries online, and has special appeal for lovers of computing arcana in its Virtual Museum of Computing.

The library is a spin-off from an original project hosted by Oxford University and is supported by the International Council of Museums. In just over three years the home page has racked up almost two million visitors and is currently registering around 2,500 hits a day, on its home site at Oxford and mirror sites in Australia, Canada, Japan, Russia, Spain, Sweden and the US.

The project is a labour of love by Jonathan Bowen, lecturer in Computer Science at the University of Reading. How it came about provides an interesting riposte to those who argue that web pages can only be a poor copy of the real thing; it is also a dramatic example of how a well-connected web site can grow organically.

Bowen's wife, Jane, was appointed director of the planned River and Rowing Museum, currently being built at Henley-on-Thames. Bowen offered to post pages on the web about the planned museum, including press releases to drum up interest in the project. As ideas flowed into the Rowing Museum site, the Virtual Museum started to develop through international exposure.

This creates the vision of a new type of museum, built from scratch by hundreds, perhaps thousands, of voluntary contributions rather than a collection pulled together by one curator. This "push curatorship" begs questions about the subjective role of the curator. It also negates the notion of a web museum being a surrogate experience. The actual museum doesn't yet exist, but it is the virtual contributions that are building it. Bowen shares the view that this virtual experience will never be a substitute but will encourage visitors' interest in seeing the actual artefacts in the flesh.

www.icom.org/vlmp/



The Natural History Museum's virtual Endeavour experiment allowed museum visitors to navigate the interior of a 3D reconstruction of Captain James Cook's ship, HM Bark Endeavour. Using a joystick, visitors could investigate the ship's cabins, view the plant and animal specimens, and explore the ship's charts, logs, drawings and sketches created during the voyage

the frustration for her, in her attempt to re-engineer the very way in which we use museums, is that many people focus on the hardware. "There is a concentration on wires and connectivity and how much it costs. What this is really about is getting hold of a hugely valuable resource — this massive stockpile of content and information. It's about capturing information and making it available."

With the linking-up of existing resources in conjunction with encouragement for visitors to design their own web pages, via its STEM project, the Science Museum could even be providing a template for the Government's much-trumpeted National Grid for Learning.

This "rich mosaic of interconnected networks and education services" aims to "enhance and enrich the curriculum, raise standards and make learning more attractive". Perhaps the DfEE also needs to start looking at training the trainers to navigate the web? We can joke that any adult is likely to lose out to an eight-year-old at a game of Tomb Raider, but when that adult is trying to guide the child through the net and the child knows more than he does, you've got problems.

Nothing like the real thing

Through techno-fear or techno-ignorance, many teachers, curators and academics will continue to dismiss the web, as a surrogate or substitute experience. They have good arguments: looking at a Van Gogh on a computer screen cannot give you the texture of the artist's palette-knifed slabs of paint; looking at

Michelangelo's David on-screen can never deliver the emotional impact of seeing the actual statue, to scale, in its "proper" setting. Perhaps those criticisms of the web experience are missing the point? One of the most exciting aspects for the museums themselves is the levelling effect of the net. The University of California Museum of Paleontology receives only 15 physical visits per day while its virtual counterpart receives around 1,000 hits. It may be a truism to say that the internet is not a mass market, rather that it delivers hundreds of thousands of micro-markets, but this is exactly where small, specialist galleries can gain. At the other end of the line, all those people who were physically or geographically unable get to a gallery, now have access.

Imagine a situation where you can design your own Raphael exhibition: some of the paintings you want are in the Uffizi, some in the Prado and some in the National. It doesn't matter; you can pull them from each gallery's web site and view them on your desktop.

As video becomes more sophisticated, the opportunity to walk around a piece presents itself. Take a look at the Natural History Museum's excellent web site and you will see a bold, if currently rather crude, walk-around of two of the museum's spaces.

The next stage

But perhaps even this is only a staging post. Jason Argoski, in his online piece "Virtual Museums: The Web Experience", believes: "The key to a successful site is to avoid trying to recreate the conventional 'museum experience'. The reality is that most of those who visit a museum's web site may never set foot in the actual museum. To the web visitor, it really doesn't matter which exhibit is on which floor."

Edward Earle, senior curator of the California Museum of Photography, another installation which has many more visitors than ever set foot in the museum "proper", has made a success of his online project by throwing away his preconceptions. "The museum views all its world-wide web projects as being unique to the web. We are as interested in the 'architecture' of the network as a space, as we are in the physical walls that de-limit gallery space."

Having thrown away the "do not touch" signs in the museums, the curators are now beginning to tear down the walls in cyberspace. The trick now is to design a new museum which exploits the physical and the virtual. ■

PCW Details

Museums Association of the UK www.museumsassociation.org
Information, publications, news on the role of UK museums.

MuseumNet www.museums.co.uk An index of UK museums.

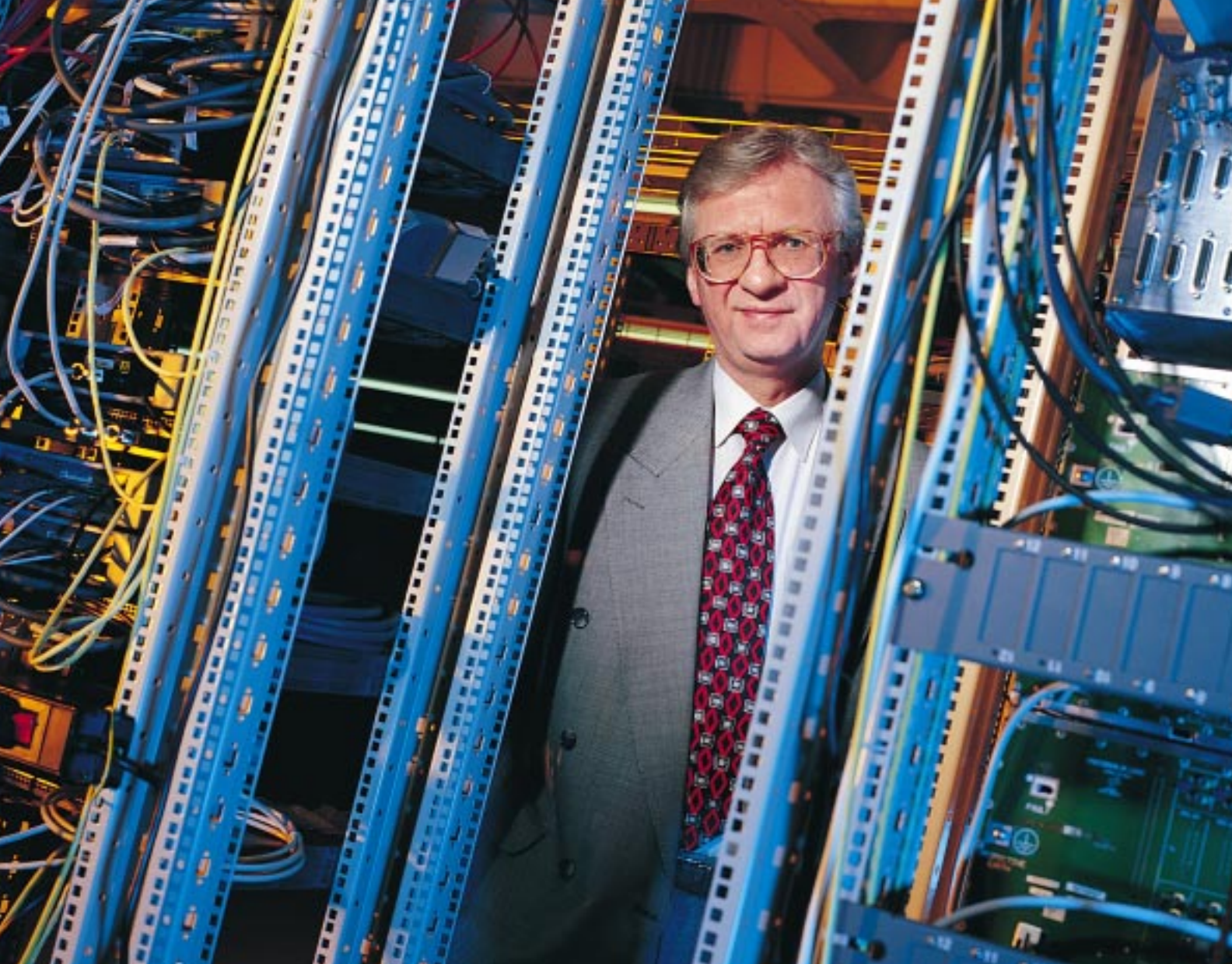
Natural History Museum www.nhm.ac.uk/

Science Museum www.nmsi.ac.uk

Virtual Museum of Computing www.icom.org/vlmp/computing.html

Links and a guide to museums and galleries, worldwide.

WebMuseum Paris <http://sunsite.unc.edu/wm/paint/auth/>
Pictures online with artist biographies.



Net gain

Ken Young puts Rod Attwooll in the frame. With a respectable CV in the industry, the IT manager now focuses his attention on Netcom, an ISP with a difference.

Rod Attwooll describes himself as a man who has been sucked into the black hole that is the internet. "I suppose it was bound to happen after all the experience I have had, in telecoms, semiconductors and in computing. I was bound to end up involved in the next big thing."

Attwooll has rubbed shoulders with many of the big cheeses over the years, including Peter Bonfield, now chairman at BT, and Rob Wilmott who, as one of the pioneers of the UK IT industry in the eighties, was chairman of ICL. Having worked for big corporations (EMI, Plessey, Texas Instruments and Mercury Communications) and startups, notably ES Squared, a pioneer of custom circuit-board design, he feels he has just what it takes to take Netcom into the millennium.

Attwooll is representative of the new breed of

managers who are getting involved in the ISP business. He has an address book stacked with contacts, he knows the telecoms business inside out, and he has a strong feel for how technology will shape future business. It is this gut feeling about which he feels most strongly. "I am interested in the future and read a lot to get a feel for what is going to happen, what sort of technology is going to make an impact. I reflect on the semiconductor business and consider the growth that has occurred in that sector... no-one predicted the kind of growth that has occurred."

Attwooll was probably born to be an engineer: he describes taking things apart at the age of four. Putting them back together probably came later, but such credentials clearly made him a suitable candidate when he began his career at Plessey working on radar technology. After ten years he was "getting an interest

“People talk about making money on the net, but for most companies it’s about using the technology to do things more effectively and make savings”

in the commercial side of things,” which led to a move to Texas Instruments as a field sales engineer.

How did he react to the US style of management? “I loved it. On my second day the boss asked me for my opinion about how things were running — I was amazed as that had never happened to me before.” He seemed to prosper under such a meritocratic system, and became salesman of the year while gaining experience moving around the business selling into different market sectors. His career with TI culminated in his becoming country manager for Denmark and then MD of TI Northern Europe.

As the new broom at Bracknell-based Netcom, Atwooll describes his approach now as one of “rebalancing the proportion of consumer and business traffic” which probably translates into “go out and get business customers” when it hits the sales floor.

Netcom has attracted criticism since its launch in May 1996 for failing to grow a significant subscriber base compared to competitors. It puts the current figure at 16,000. This places the company some way down in the unofficial ISP league tables, and way behind the market leader, CompuServe, which has around 400,000 punters. At 16,000 it rubs shoulders with the likes of CiX, which is the UK’s most popular conferencing service but openly admits that it is a minnow as far as the ISP stakes go.

Netcom was launched with a fair degree of marketing chutzpah in May last year. It was well received by many reviewers and with nearly half a million subscribers in the US at the time, there were few who doubted that the company meant business and had a good chance of making a strong entrance into the UK market. But the arrival of many other ISPs giving away connections for up to three months — notably AOL, MSN and Virgin Net — meant that new customers were increasingly looking for free connection. Some were even moving around after each offer ran out and thus avoiding payment altogether.

Netcom admitted it had to change its strategy and that its bid for the consumer market had failed when in February this year its then MD, Dave Clarke, outlined in interviews the new business plan to target businesses more directly. While the figures may have suggested this was the right approach, it remains open to question whether Clarke had enough time to prove its success. In July this year he left to head up arch-rival Virgin Net while his right-hand man, sales and marketing manager David Furniss, moved to take up a similar role at Demon.

So what went wrong? Not surprisingly, Atwooll doesn’t subscribe to the theory that something did go wrong. “We don’t offer a free service and we are not the cheapest because we believe in a quality service,” says Atwooll. “Good infrastructure, good support, good investment. That’s the business we are in. It’s true we spent a lot of money trying to get consumers to use our service, but the internet has moved on since then and we are in a good position to meet the needs of businesses

linking to the web. Things have only really just started in the business area.” Atwooll points out that the company was the first in the UK to offer integration of US Robotics X2 technology to allow subscribers to connect using the new 56Kb modems, and that Netcom has invested in an ATM (Asynchronous Transfer Mode) link to the US.

One approach that seems to be yielding results is working with key players in particular market sectors. A notable win is the customer Norwich Union, which has installed internet access across all its life and pensions sales branch offices. As part of the deal, Norwich Union is encouraging Independent Financial Advisors (IFAs) to use Netcom to link to the company’s web site and keep in email contact. IFAs can order the service either through Norwich Union sales or direct with Netcom. It has also made an inroad into the online information provider market with an agreement with Sift, a company which provides specialised information to accountants. Sift has designated Netcom as its preferred ISP and encourages new users to link to its service via a Netcom connection.

Having only been in the job for a few months, Atwooll is getting to grips with the business rather than calling for big changes. So what has he learnt about the business so far? What plans are emerging? “Firstly, it is that ISPs like us offer so many different aspects to the service and new subscribers don’t want to have to make such a complex choice. It’s a bit like buying a hi-fi — most people just want an off-the-shelf solution. That’s why we offer three basic packages — Netcom Enterprise Connect, Netcom Enterprise Mail, and Netcom Enterprise Mail Connect — to make the choice simple.”

But with all the talk in the industry of narrow margins and increasingly intense competition, I wondered about Atwooll’s master plan. “We are going to track our marketing very carefully and re-use what delivers results. But the funny thing is, I have discovered that most business accounts have come by referral rather than advertising.” Not surprising, then, that one of the biggest accounts is with near neighbour, Siemens.

Meanwhile, he’s philosophical about the industry: “It’s like the early days of the semiconductor industry. No-one realised then how big it would become. The growth was unbelievable and now we’re seeing the same type of growth with the internet. You can create a show window to the world for the price of a connection.”

Unlike others in the industry, he doesn’t believe in telling customers there is a pot of gold to be made on the net: “People talk a lot about making money on the net, but for most companies it’s about using the technology to do things more effectively and make savings. The key to making a profit often lies in making savings rather than spending money.”

PCW Details

Ken Young is a freelance editor and journalist
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■ The Michael Hewitt Interview will return next month.



The price is right

If you want to spend up to £1,000 *and not a penny more*, look no further than Paul Trueman's round-up of budget PCs at an all-inclusive price.

You know all those advertisements that promise the computing world for a stunningly low price? The specifications they boast easily blow your own machine out of the water. But — and there is always a but — you catch sight of that killer phrase “ex VAT and delivery”, which usually translates as, “that will be another couple of hundred pounds on top, please”. And so your dream machine moves swiftly out of your price range and into the realm of wishful thinking.

Why not go for the ultimate spring clean and relegate your tired old PC to secondary status? Replace it with a brand-new successor, chosen from our comprehensive guide to the best buys for under a £1,000 — *inclusive of VAT and delivery*.

For this month's PC group test, we approached ten companies and asked them to supply the best-value package they could manage for the money. We provided no technical specifications because we wanted the manufacturers themselves to decide what constituted a well-balanced machine. All we asked was that the machine be internet-ready and have the usual multimedia capabilities. The very best machines we received left those modest requirements a long, long way behind.

We tested a remarkable array of hardware, the whole gamut of processors from Cyrix 6x86 to the Pentium II, and PCI and AGP (Accelerated Graphics Port) graphics accelerators. Some included inkjet printers, joysticks and mountains of

office and gaming software.

All that remains is for you to check them out, secure in the knowledge that all the usual “hidden” costs have been included in the price.

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Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

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ANS PCM4

The appearance of the ANS is impressive and the casing reflects some real design flair. Compared with some of the other machines here, the AMD K6 166MMX processor is a little underpowered, but the rest of the technical specification was impressive enough: an ADI monitor, 32Mb of SDRAM memory, a 3.1Gb hard disk and a 56K modem. Less generous was the package of extras: other than MS Works 4.5, which was bundled, there was no other software, nor any of the peripheral extras that other companies included.

The ANS machine was well put together inside, with plenty of space for anyone wishing to tinker or upgrade. It was good to see that ANS had placed two USB bays in the back of the machine, too, considering that 1998 should be the year in which USB finally takes off. Connecting to the internet was no problem

and the speed of the Rockwell K56 Flex ensures that



waiting for web pages online is kept to a minimum (and thus, so are your bills).

Although the K6 processors are generally thought to be slightly faster than their Intel counterparts, most of the machines we saw were fitted with P200s or higher and the K6 166 consequently scored slightly lower in the BapCo tests. This machine let itself down on the Quake test where, inexplicably, it was unable to provide the 640 x 480 resolution at which we run the frame-rate test. The best it could offer was 360 x 480 and even at that lower resolution the frame rate was disappointing. ANS had supplied a CD full of drivers for the ExpertColor sound and graphic cards that the PC used, but none of our tweaking could produce a better frame rate.

The ADI Provista E40 15in monitor provided an excellent picture, providing a rock-steady 85Hz vertical refresh rate at a 1024 x 768 resolution, although it was capable of a non-interlaced resolution of up to 1280 x 1024 at 60Hz. There were no on-screen controls but the manual controls were easy to use.

PCW Details

Price £999 inc VAT & delivery (£850 ex VAT)

Contact ANS 01744 883663
www.adv-net-sol.co.uk

Good Points Attractive appearance. Excellent build quality.

Bad Points Little software. Underpowered processor in comparison to others.

Conclusion A well-built machine let down by poor graphics capability and stingy software bundle.

Build Quality ★★★★★
Performance ★★
Value for Money ★★
Overall Rating ★★★

Choice Ultra Multimedia

The Choice Ultra Multimedia came with a massive 4.1Gb hard drive, giving some serious storage space compared to the other machines which mustered up an average of between 2 and 3Gb. The machine stood out from the rest in appearance, with its attractive blue stripe down the front breaking the PC colour code of beige cases.

As we all know, though, beauty is only skin deep and it's what's inside that counts. Here, the Choice seemed admirably put together, and the smaller ISA modem and sound cards it was fitted with made the inside of the machine appear cavernous.



Appearances can be deceptive, however, and although there is room to fit another 5.25in drive, because the hard drive is fitted in the bay below the floppy drive there is no room for another 3.5in drive, should you wish to fit one.

The taped-up wires leading from the hard drive to the power unit, and the IDE connections suspended over the memory, made it a little fiddly should you ever want to upgrade the RAM.

Choice did not bundle any peripherals or software other than Lotus SmartSuite 97. The Contec 50W speakers were excellent, ideal for gaming software, and they even played audio CDs at loud volume with no loss of sound quality. We were also taken with the Fujitsu keyboard, ideal for speed typing with its solid base and keys that are light to the touch.

The Hansol E15AL monitor gave a satisfactory refresh rate of 70Hz with a 1024 x 768 resolution, although this is the bare minimum for a flicker-free display. The picture focus suffered around the corners of the screen, and there were variations in colour tone when showing a white background.

PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)

Contact Choice 0181 993 9003 (no URL)

Good Points Massive hard drive.

Bad Points Little software. Fiddly interior.

Conclusion Disappointing.
Build Quality ★★★
Performance ★★★★★
Value for Money ★★★
Overall Rating ★★★

Codec Hermes

The instantly striking feature of the machine we received from Codec was its large size: it's a cream-coloured, desk-swallowing monster compared to some of the smaller mini-tower cases we received. There was good reason for this, though, as the case housed Intel's next-generation CPU, the much-trumpeted Pentium II. Joy and elation abounded until we realised that to include the PII running at 233MHz, Codec had cut back on other components. New technology comes at a price, and the Codec contained only 16Mb of SDRAM. Similarly, there were no peripherals, or software suites like Lotus SmartSuite 97, to be found. That said, if one could



choose between a machine with an abundance of memory and the older Pentium processor, or the new PII and less RAM, then in this reviewer's opinion the latter is preferable. RAM is cheap and plentiful and shouldn't really lighten your wallet, whereas installing the PII means upgrading to a new motherboard that supports Intel's proprietary Slot1 technology.

Probably due to only being fitted with 16Mb of RAM, the Codec performed quite poorly in the BapCo tests. It had the only graphics card with 2Mb of VRAM (all others with 4Mb), which may have been why it was incapable of providing the 640 x 480 resolution at which we run the Quake test.

As Codec hasn't skimped on the size of the case, expansion should not be a problem for anyone wishing to upgrade memory and cards, and the Slot1 motherboard with a PII processor also includes Intel's graphics technology, the AGP slot. Codec hadn't included an AGP card to fill it with, but the option is there.

The 15in Smile monitor was only capable of a shaky 60Hz at 1024 x 768, and although it afforded a sharp, bright picture around the edges of the screen, towards the centre there was slight loss of focus, noticeably blurred when working with text.

PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)

Contact Codec 0181 664 8500
www.codec.net

Good Points One of only two machines in the test to be fitted with a PII processor.

Bad Points The rest of the package was a let-down in comparison.

Conclusion If you don't mind upgrading memory, this has potential

Build Quality ★★★★★

Performance ★★★

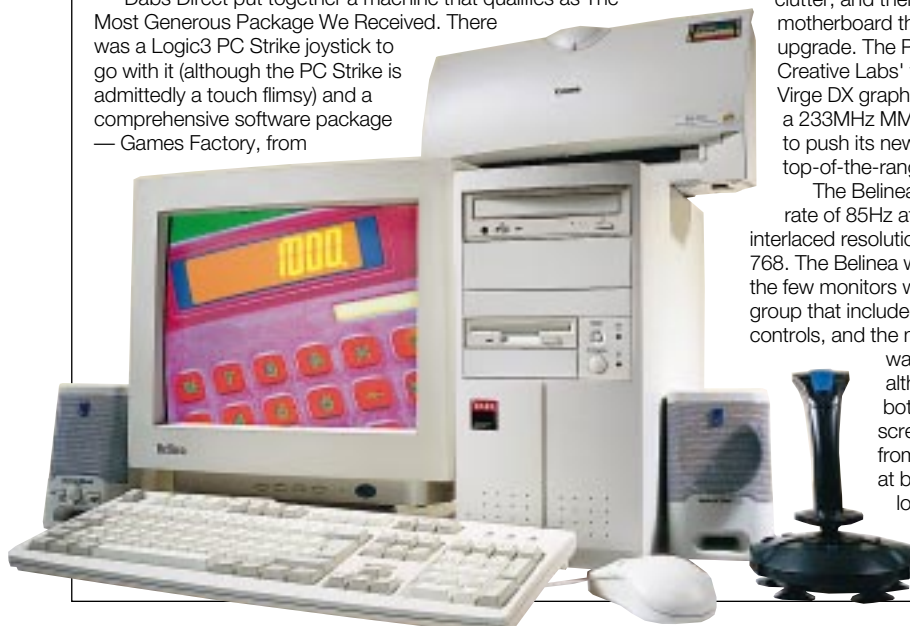
Value for Money ★★★

Overall Rating ★★★

Dabs Direct Atlantis Home Office

If you are short of space to house a PC, then this model from Dabs Direct might be one to consider. Housed in a short, slim, mini-tower case, it doesn't take up much room; although as we discovered when we opened up the PC, this spatial economy does come at a price. Unfortunately, the connections from the CD, floppy and hard drive all gather over the DIMM memory slots. They might be easier to move out of the way if the low-slung Seagate hard drive wasn't also close to the memory slots, making future upgrading of memory a difficult business.

Dabs Direct put together a machine that qualifies as The Most Generous Package We Received. There was a Logic3 PC Strike joystick to go with it (although the PC Strike is admittedly a touch flimsy) and a comprehensive software package — Games Factory, from



Europress, all contained on one disk, as well as Lotus SmartSuite97. Added to this was the Canon BJC-250, a very good colour inkjet printer that did well in our group test in the January 1998 issue. Worth around £150 when bundled with the PC, this represents excellent value for money.

There were expansion slots for both 3.5in and 5.25in forward-facing drives, and space for another one ISA and two PCI cards. Despite the restrictive size of the case, there wasn't the impression of clutter, and there was also an excellent manual on the AB PX-5 motherboard that would be invaluable to anyone looking to upgrade. The PC was fitted out with some dated but decent kit — Creative Labs' venerable SoundBlaster 16, and S3's Virge DX graphics card with 4Mb of VRAM. Underpinning that was a 233MHz MMX processor, proof of Intel's determination to push its new PII by lowering prices on its previous top-of-the-range chips.

The Belinea 15in monitor was capable of producing a refresh rate of 85Hz at a non-interlaced resolution of 1024 x 768. The Belinea was also one of the few monitors we saw in this group that included on-screen controls, and the monitor's picture was sharp although the bottom inch of the screen suffered from a lack of focus at both high and low resolutions.

PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)

Contact Dabs 0800 558866
www.dabs.com

Good Points Excellent value for money backed up by performance.

Bad Points Difficult to get to the RAM inside.

Conclusion An excellent overall package.

Build Quality ★★★

Performance ★★★★★

Value for Money ★★★★★

Overall Rating ★★★★★

Personal Computer World

Highly Commended

Intronet Solutions' Solutions Carousel

Intronet Solutions takes great pride in its hands-on approach to providing customers with an individually tailored PC package: the company certainly provided one of the most generous all-round packages in this group. As well as the basic configuration, Intronet provided a sturdily impressive Logic3 PC Tracer joystick as well as a microphone/headset and an Epson Stylus Color 300 printer — undeniable value for money.

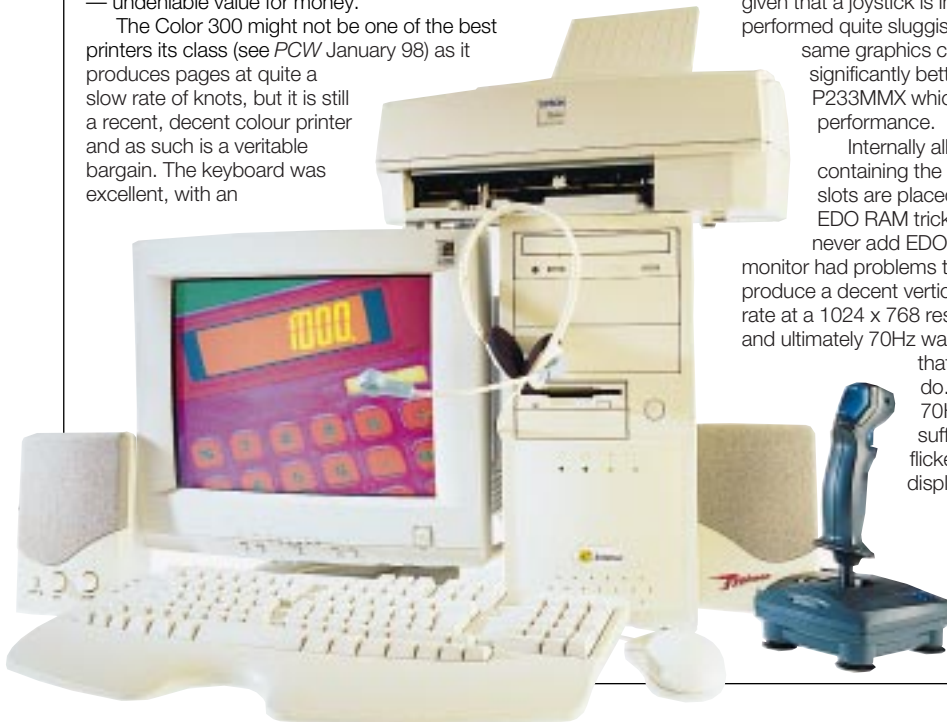
The Color 300 might not be one of the best printers its class (see *PCW* January 98) as it produces pages at quite a slow rate of knots, but it is still a recent, decent colour printer and as such is a veritable bargain. The keyboard was excellent, with an

ergonomic design and legs on the underside that enable you to slant the keyboard at different angles.

The Carousel was fitted with the Cyrix 6x86MX chip running at 150MHz which, Cyrix claims, is the equivalent of a P200. BapCo test results bore out this claim, with the Intronet PC posting similar results to that of P200 machines with the same amount of memory. Ironically, given that a joystick is included in the package, this machine performed quite sluggishly on the Quake test. It had the same graphics card as the Dabs Direct PC which performed significantly better, although that PC was fitted with a P233MMX which probably accounts for the improved performance.

Internally all is neat and tidy, with the DIMM slots containing the SDRAM relatively easy to access. The SIMM slots are placed next to the hard drive, making the addition of EDO RAM tricky, but this is not an issue because you would never add EDO to existing SDRAM. The Hansol 15in E15AL

monitor had problems trying to produce a decent vertical refresh rate at a 1024 x 768 resolution, and ultimately 70Hz was the best that it could do. However, 70Hz is just sufficient for a flicker-free display.



PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)
Contact Intronet 0181 660 3635
www.intronetsolutions.co.uk
Good Points Great bundle, including the printer, software and joystick.
Bad Points Disappointing performance.
Conclusion One to consider if you are looking for a complete home package.
Build Quality ★★★
Performance ★★
Value for Money ★★★★★
Overall Rating ★★★

MBC Ultimate

Micro Business Computers called the machine they submitted to our test the "Ultimate". A grandiose name perhaps, but this is an impressive product, the compact mini-tower packed full of quality desirables. The Ultimate has an impressive 3.2Gb Quantum Fireball hard drive as well as one of the more powerful processors we saw, the P233MMX. Where most companies had opted for the SoundBlaster16 sound card that has been a staple of lower-end machines for several years, MBC was one of only two companies in our test to have gone for the more recent Creative Labs card, the justly lauded SoundBlaster AWE64. The other ISA slot was taken by the speedy Pace 56 modem, nestling next to the ATi graphics card. Shining metal inside, all was

taped-up neatness, with wires to and from drives cleanly out the way. It was good to see that extra care seemed to have been taken with the IDE connections between drives, with the leads going around the memory rather than across it, making access difficult, as with so many other PCs. The hard disk had been slung underneath the floppy drive, meaning that it took up one of the 3.5in drive bays, but with the advantage that it left the SIMM and DIMM slots uncluttered and easy to access.

Producing the sound were 150W Turando speakers, and they provided a clean bass sound with little distortion, even when playing audio CDs. Bundled software includes Lotus SmartSuite 97 and two free-trial internet packs, from BT and Demon.

The very impressive Optiquess V655 monitor had 13.8in of viewable screen, and although it had a slight loss of focus in the centre, it did have excellent on-screen controls, as well as being able to produce a 1152 x 864 resolution at up to 75Hz.



Personal Computer World

Highly Commended

PCW Details

Price £981 inc VAT & delivery (£835 ex VAT)
Contact MBC 0181 208 2333
www.mbc1.co.uk
Good Points Top-quality hardware.
Bad Points No USB connections.
Conclusion A very impressive PC.
Build Quality ★★★★★
Performance ★★★★★
Value for Money ★★★
Overall Rating ★★★



Mesh Elite Professional PII233M

Mesh has trumped all other contenders with this machine. The Pro is one of two machines in this group to house a PII 233, but Mesh has then backed that up with a stunning configuration for the same price. The whole package screamed class right from the start, with an introduction to the PC as soon as we opened the first box, and a poster-and-manual pack explaining how to set up the PC if we were unsure.

Inside the large case is the towering Asus P2197A motherboard using the Intel 440LX chipset. The Pro has double the RAM of the other PCs we saw, with a whopping 64Mb of SDRAM on two DIMM slots, leaving one free for future expansion. The three slots can be fitted with a theoretical maximum of 384Mb

of 168-pin RAM modules.

The Mesh was also one of only two PCs to have a 4.1Gb hard drive, and it was the only one to have an AGP accelerator, ATI's Xpert@Work. As befits the rest of this progressive machine, the on-board Xpert@Work has been fitted with 4Mb of SGRAM, the newer, faster form of video memory. The Xpert@Work was fitted onto the motherboard and, while there is no difference in an ATI card's performance whether slotted or on-board, it was a shame there was no actual AGP slot. Without that, the possibility of upgrading to a different AGP card, or increasing the amount of SGRAM, is eliminated.

The Quake frame rate score was on a par with the other machines because an AGP is maximised for games run through Windows 95. When we ran the game through Windows 95, it scored considerably better than the other machines that were running it through DOS.

The ADi Provista E40 managed a healthy 75Hz at a 1024 x 768 resolution and had a sharp, uniform focus. There were no on-screen controls but the manual controls were easy to use.



PCW Details

Price £999 inc VAT & delivery

(£850.21 ex VAT)

Contact Mesh 0181 452 1111

www.meshplc.co.uk

Good Points Too many to list here.

Bad Points Upgrading the AGP card is not possible without a slot.

Conclusion Superb value for money.

Build Quality ★★★★★

Performance ★★★★★

Value for Money ★★★★★

Overall Rating ★★★★★

Protek UltraMX

The UltraMX is a well-built PC with attractive casing, although there is a square indentation on the front that looks like the space where a company logo should be. Inside there is plenty of room for expansion on the socket 7 motherboard, and although the PC is fitted out with 32Mb of slower EDO RAM in the SIMM slot, if you wish to upgrade to SDRAM then it is very easy to get to the RAM DIMM slots, with the hard drive out of the way under the floppy drive.

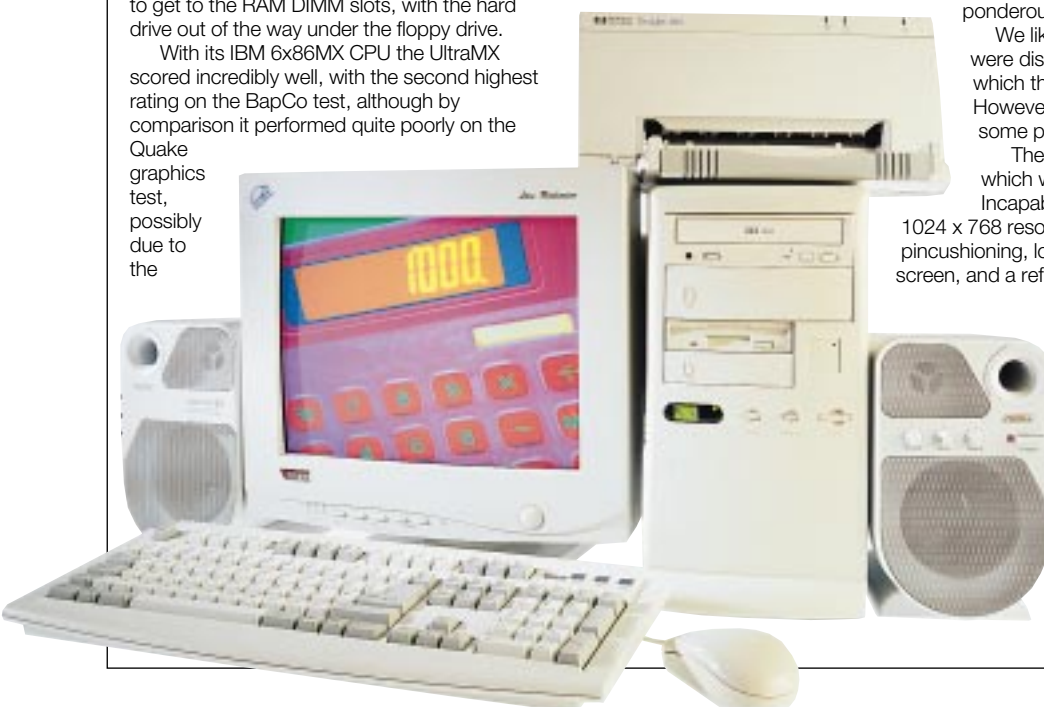
With its IBM 6x86MX CPU the UltraMX scored incredibly well, with the second highest rating on the BapCo test, although by comparison it performed quite poorly on the Quake graphics test, possibly due to the

Diamond Stealth 3D Pro 2000 graphics card. The Protek is one of the few packages not to include Lotus SmartSuite 97, or any other software for that matter, but it is still a very generous bundle, with a Hewlett-Packard DeskJet 400 printer included in the overall package. The DeskJet 400 is an good inkjet printer for people who perhaps are printing at home for their own use, producing three pages per minute (ppm) with black text and a somewhat more ponderous 0.7ppm for colour printing.

We liked the ergonomic Kensington mouse but were disappointed by the Videal keyboard, on which the keys were far too loose for our tastes. However, keyboard action is a personal thing and some people might like it.

The monitor was a 15in Videal model for which we struggled to find a redeeming feature.

Incapable of a non-interlaced refresh rate at a 1024 x 768 resolution, even at 800 x 600 there was pincushioning, loss of colour towards the sides of the screen, and a refresh rate of 60Hz that caused headaches after ten minutes of use.



PCW Details

Price £999 inc VAT & delivery

(£850.21 ex VAT)

Contact Protek 0500 127498 (no URL)

Good Points Very good value for money.

Bad Points Poor keyboard. Shocking monitor.

Conclusion An excellent performer with a printer thrown in.

Build Quality ★★★

Performance ★★★★★

Value for Money ★★★★★

Overall Rating ★★★

System Powerstation

System is a young company, having started up in April 1997, and the PC it submitted for review had a lot to commend it. The Powerstation appeared well built, with a minimalist external appearance and a very spacious internal setup. There were two spare front-facing 5.25in bays below the CD-ROM, and the possibility of squeezing in a 3.5in drive between the floppy and hard drive. The floppy-drive position meant that there was easy access to the memory slots, a good design for anyone with an eye to upgrading from the supplied 32Mb of EDO RAM.

The Powerstation was fitted with the most common choice of sound card in this group test, the SoundBlaster 16 Vibra, complemented by impressive Typhoon speakers.

Creative Labs had also supplied the graphics card, its Graphics Blaster Exxtreme. All the cards came with their drivers (not as common an occurrence as you would believe), and System added the nice touch of producing its own manual, among the others supplied, to accompany the warranty. Unfortunately, no matter what driver we tried, the Powerstation was not capable of producing the required resolution on the Quake test, although it scored well on the BapCo test. There was no joystick supplied to play games, nor any of the extras that other companies bundled for the thousand pounds. Build and component quality was not in question, but one or two peripherals or pieces of software other than Lotus SmartSuite 97 could have been added to increase its value for money.

The Hansol Mazellan 500P monitor performed reasonably well, and although there were no on-screen controls, there were user-friendly manual controls. The monitor had no problems producing a rock-solid 85Hz vertical refresh rate at 1024 x 768 resolution, but did suffer some blooming, and it was not really a sharp enough focus to look at for long periods.



PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)
Contact System 01323 520111 (no URL)
Good Points Plenty of room for expansion.
Bad Points Poor performance in the Quake test.
Conclusion Other companies offer better value for money.
Build Quality ★★★★★
Performance ★★
Value for Money ★★
Overall Rating ★★★

Watford Electronics Aries Promedia TX98

Watford Electronics has put together an impressive package: an attractive case, good speakers with Watford's Aries brand stamped on them, one of the best keyboards we saw, an equally impressive software bundle, and a PC full of quality components. Few other companies included much software in their packages other than the ubiquitous SmartSuite97, some choosing to add peripherals instead, others not bothering with either. Watford Electronics appeared to have struck a good balance between the two, bundling five Compton titles including the Atlas and the Encyclopedia, as well as Luckman's WebEdit Pro and Best of the Web. There was also a CD to connect up to the ISP Connect 2, which aims to simplify the process of getting on to the internet for non-techie types. The 80W speakers are excellent, with rather natty stands to lift them

up, preventing sound being lost through a contact surface underneath.

Inside all was neatness itself and the Asus TX97 motherboard was not obscured by leads or drives, as was the case with other PCs here. There is plenty of room for expansion, with one 3.5in slot and two 5.25in bays free, all forward-facing.

There was a definite feel of quality to the TX98, enhanced by components like the Creative Labs AWE64 sound card, the K56 modem and the excellent Aries-brand keyboard, the best of any in this group. With an attachable wrist-rest and neat touches like a Reset button—the equivalent of pressing Control/Alt/Delete—it was a pleasure to use.

The CTX 1555E suffered at the higher resolution of 1024 x 768, with an unacceptably flickery 60Hz refresh rate. The CTX was one of only three monitors we saw that included on-screen controls which we found to be very easy to use. A great monitor at lower resolutions, but it couldn't cut the mustard at anything higher than 800 x 600.



PCW Details

Price £999 inc VAT & delivery (£850.21 ex VAT)
Contact Watford Electronics 01582 745555 www.watford.co.uk
Good Points Excellent keyboard, components and software.
Bad Points No USB support. Monitor can't hack it at 1024 x 768.
Conclusion A machine packed full of reasons to buy one.
Build Quality ★★★★★
Performance ★★★★★
Value for money ★★★★★
Overall Rating ★★★★★

Accelerated Graphics Port (AGP)

Accelerated Graphics Port is a new graphics slot, developed by Intel and recently released with its new generation of Pentium II processors and the 440LX chipset. More often found as an AGP card in its own slot, it can also be included on the motherboard.

The AGP slot is a dedicated data bus for graphics that has a bus speed of 66MHz, twice the speed of the 33MHz sustained by the PCI slot. Its purpose is to enhance image rendering on your monitor, especially computing-intensive 3D graphics, and is ideal for anyone who is into serious 3D gaming or who needs workstation graphics power for 3D programming and animation. When AGP cards were first introduced it was necessary to buy the only motherboard that had an AGP slot, with Intel's 440LX chipset with the PII processor the only motherboard and CPU that would support it. It is now possible to simply replace the motherboard, as there are clones available that can combine with the "classic" socket 7 Pentium CPUs.

Synchronous DRAM is a type of Random Access Memory (RAM). RAM is commonly inserted into PCs by soldering several chips onto long, thin, small cards known as memory modules. A typical PC motherboard will have from two to eight slots for these memory modules to be fitted into. The recent Dual In-line Memory Modules, or DIMMs, look very similar to conventional Single In-line Memory Modules (SIMMs). However, DIMMs, which have 168 pins, support fast 64-bit data transfers. Many PC motherboards feature both SIMM and DIMM slots, but you can't use both at the same time.

DIMMs can carry either Dynamic RAM or SDRAM chips, with each module typically having 32Mb or 64Mb fitted. SDRAM is quicker than other types of RAM and its use will increase your PC's performance. It works by synchronising signal input/output, so the memory chips work at the same speed as the CPU. Your motherboard must be structured to work with SDRAM.

■ **Pentium II** Intel's current high-end processor is the successor to both the standard Pentium and the earlier, high-end Pentium Pro. It is optimised to run old 16-bit and new 32-bit software equally well, and features **MMX technology** as available on recent Pentium processors. MMX technology is designed to race through multimedia tasks such as audio, video and graphics. Previous chips were fitted into standard, square slots on the PC's motherboard, allowing users to easily upgrade, but Pentium II processors now sit on large cartridges connected to the motherboard using a new slot, incompatible with the older sockets. The processor's 512Kb Level 2 cache memory is also on the cartridge. Pentium IIs are available with clock speeds of 233, 266, 300 and 333MHz, and 366MHz



processors will be released soon.

■ **Universal Serial Bus (USB)** The long-awaited replacement for the PC's ageing serial bus and ports is predicted to take off this year. Today, your keyboard, mouse, printer, modem and almost everything else connect to different plugs on the back of your PC, which is very confusing. USB allows all these devices to be chained together and connected to a single USB port. USB hubs can be connected to a USB port, supporting up to seven further USB devices including another USB hub. All in all, up to 127 USB devices can be chained off a single USB port. Monitors are ideal for housing USB hubs, since the ports are conveniently positioned in front of you, and ADI and Philips are now producing monitors with attachable USB hubs. Each peripheral is automatically managed by the PC under Windows 98 (the forthcoming version of Windows 95). The PC senses which peripherals are connected, even if they are plugged in while the system is running, and will manage drivers and bus resources for them. It is still early days for USB, with few peripherals available, while many PC manufacturers are not even enabling the ports, despite being fitted to all new motherboards as standard. Nevertheless, Microsoft will be issuing USB drivers for Windows 95 users.

■ **Millennium compliance** The oft-discussed Year 2000 problem is threatening all sorts of computing catastrophes (see *PCW* February 98). Realistically it shouldn't cause too many problems for home PCs, but from now on *PCW* group tests will check the machines for millennium compliancy (until the year 2000, when of course you'll know one way or the other). We will run the Span 2000 software which checks the PC's BIOS and therefore the RTC (Real Time Clock). The software checks whether the machine has been left on overnight on 31st December 1999 or rebooted on the morning of 1st January 2000, as well as discovering whether the PC can handle leap years in the year 2000.

Intel's Pentium II processor sits with its Level 2 cache on a cartridge which fits into a Slot 1

How we did the tests

The SysMark 95 test is provided by BapCo (Business Applications Performance Corporation) which specialises in designing tests based on real-world applications. Its members include many heavyweight IT companies like Apricot, Compaq, Dell, Gateway 2000, Hewlett-Packard, IBM, Intel, Lotus, Microsoft, Motorola, Digital and Texas Instruments. BapCo operates on a non-profit basis with a mission to develop the best objective performance benchmarks for PCs. These tests measure the speed of the computer running a series of common applications.

● In this group test we used the SysMark 95 benchmark which measures system performance under Windows 95.

● Eight popular applications are used in the test: Microsoft Word 7, Lotus WordPro 96, Microsoft Excel 7, Borland Paradox 7, CorelDraw 6, Lotus Freelance Graphics 96, Microsoft PowerPoint 7 and Adobe PageMaker 6.

● The time taken to perform a variety of tasks is measured for each application. To eliminate the possibility of spurious results, each test is performed three times.

● Basing the benchmark on the bestselling business software packages means that the result is a genuine reflection of how the PC will perform in actual day-to-day use.

Quake test

The Quake test is an unofficial benchmark available to anyone who happens to own a copy of Quake. The frame rate test is a good test of the PC's overall performance, especially in the graphic and floating-point unit (FPU) intensive game environment.

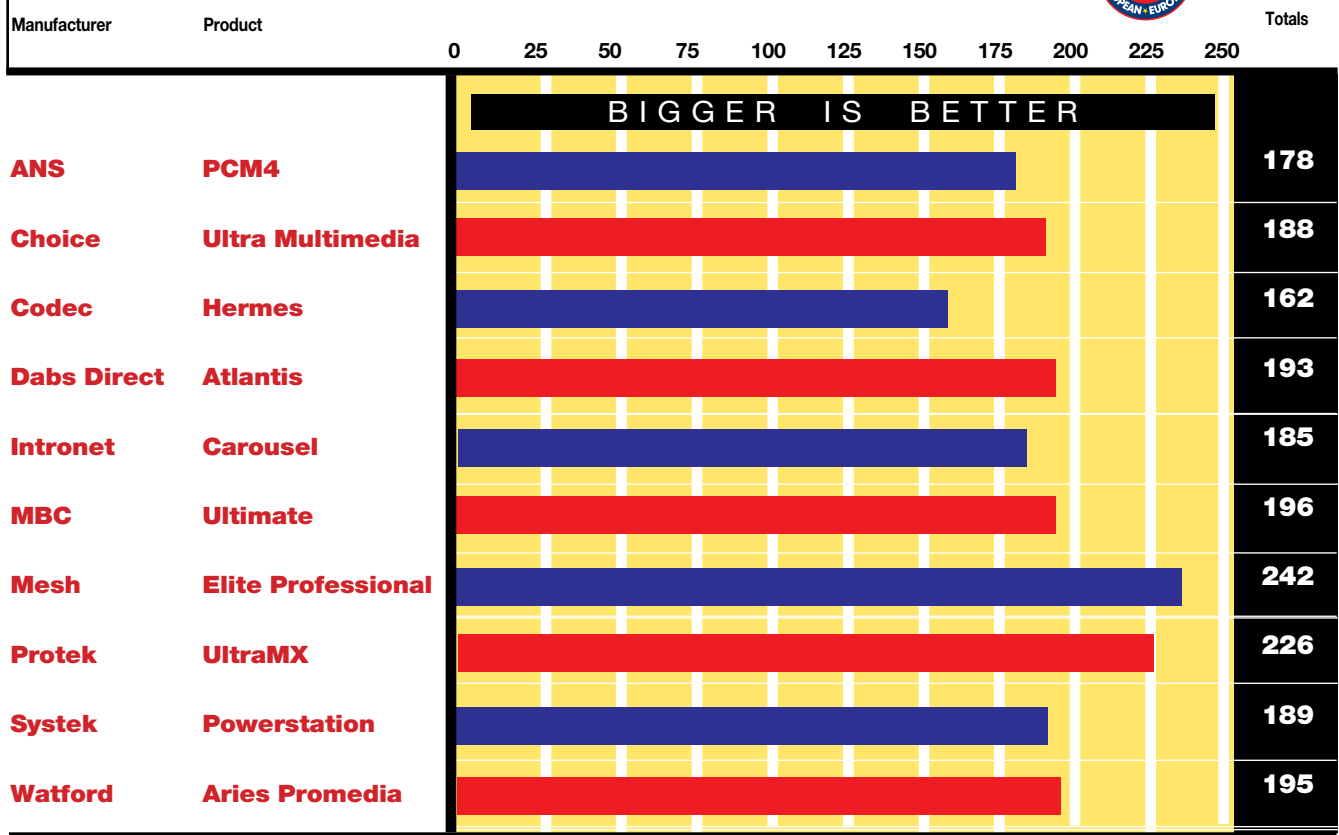
To run the test at home

1. Start your PC in DOS mode and run Quake. Start a New Game but do not move your player from the starting position.
2. Change the Video Mode to 640 x 480 (some graphics-card drivers cannot support this mode, in which case you should switch to 320 x 240).
3. Select Console and enter "viewsize 120" to ensure the test is run full screen.
4. Enter "time refresh" to run the test.

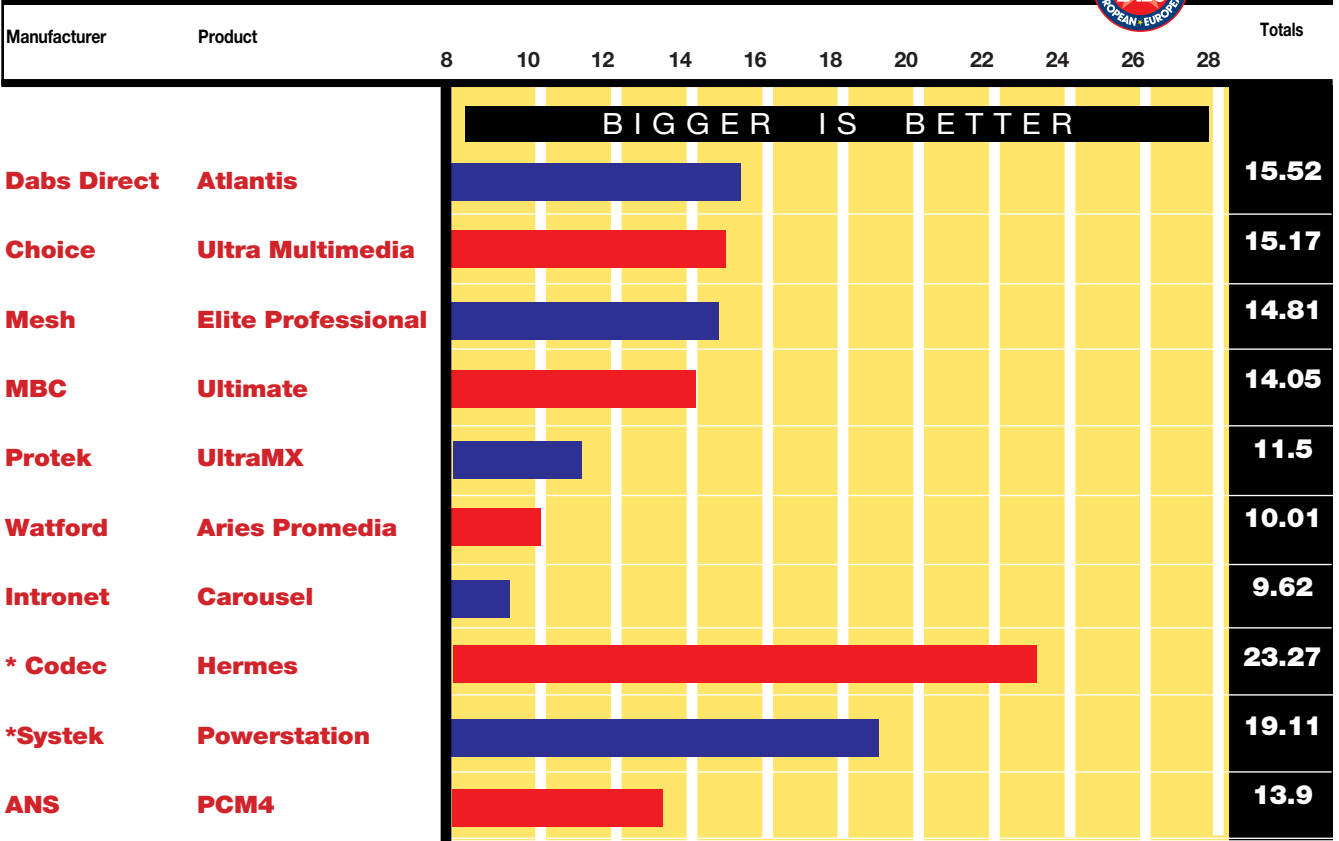




BapCo test results



Quake test results



* The Codec, Systemk and ANS machines were unable to run the Quake test at the usual resolution of 640 x 480. Their maximum resolution is 360 x 480.

Editor's Choice

It would be exaggerating to say that the technical specifications of the best PCs in this group test represent the average £1,000 package. As this group shows, there is no longer any such thing as the "average" budget package. There are generous PC-printer-joystick-software bundles available, ideal for families who want to play games, print essays, travel the internet, manage accounts and play music. We have also seen high-powered machines that should satisfy the demands of an experienced user in business or at home.

"Typically, these budget PCs came with a 1.2Gb hard drive, 256Kb of Level 2 cache, a basic 16-bit sound card, eight-speed CD-ROM drive, average 14in monitor and very little software." So went the Editor's Choice for the budget PC round-up of precisely a year ago. In the year since that article was published, the Pentium II has arrived and is now available in machines that for the same price 12 months ago were boasting P133s. For £1,000, 32Mb of SDRAM, 512Kb of secondary-level cache and 3D graphics cards are now taken for granted.

A pattern developed during this group test, of companies really impressing with some of the components in their PCs, or perhaps with the extravagance of the peripherals included. Then they seemed to shoot themselves in the foot with the rest of it. Our spirits soared when the computer from Codec arrived, replete with PII processor running at 233MHz. Then we realised that Codec

had economised in a vital area of importance — it provided only 16Mb of SDRAM. Admittedly, memory is fairly inexpensive these days, but there was only 2Mb in the graphics card too, and no-one wants to have to reach for their wallet to start upgrading, having already just parted with a grand for a system.

On the other hand, Intronet Solutions deserves praise for providing a very generous bundle, although its machine was slightly underpowered in comparison to others. This probably all sounds needlessly harsh, but then, you have the right to expect high standards of components, even for a relatively low price.

Before the gongs are given out, an honourable mention should go to the machine that Protek turned out. It scored extremely well in the tests, was bundled with a good printer, had an attractive design and was well put together. But it would be impossible to recommend a PC with such a downright awful monitor. Watford Electronics also deserves praise for a machine that exuded class, and came with a good software bundle as well as excellent components.

The first of our **Highly Commended** awards goes to **Micro Business Computers (MBC)** for its **Ultimate** machine. This had a Pentium 233MHz MMX processor, the impressive ATI 3D Charger graphics card, Creative Labs' celebrated SoundBlaster AWE64 sound card and bundled Lotus

SmartSuite 97. The second **Highly Commended** goes to **Dabs Direct** for striking the balance between performance, build quality and value for money. Dabs was a principal proponent of the bundle — the trick of including a dizzying amount of kit for a seemingly ludicrous price, and its Atlantis Home Office system still managed to produce very impressive test scores.

Finally, our **Editor's Choice** award goes to a machine that, in terms of specification and power, was head and shoulders above the others reviewed. Apart from the massive 64Mb of memory, the **Mesh Elite Professional PII233M** wins plaudits for including a 4.3Gb hard drive and an AGP graphics chip. Although it is impossible to upgrade, being on-board, the Xpert@Work is an excellent graphics system. Machines with specifications like this set standards for other manufacturers and ensure that you don't need to have won the lottery to get your hands on very desirable kit. ■

Here's to the winners: Mesh (above) won by a mile on spec and power, while MBC (left, top) and Dabs Direct (left) come highly recommended










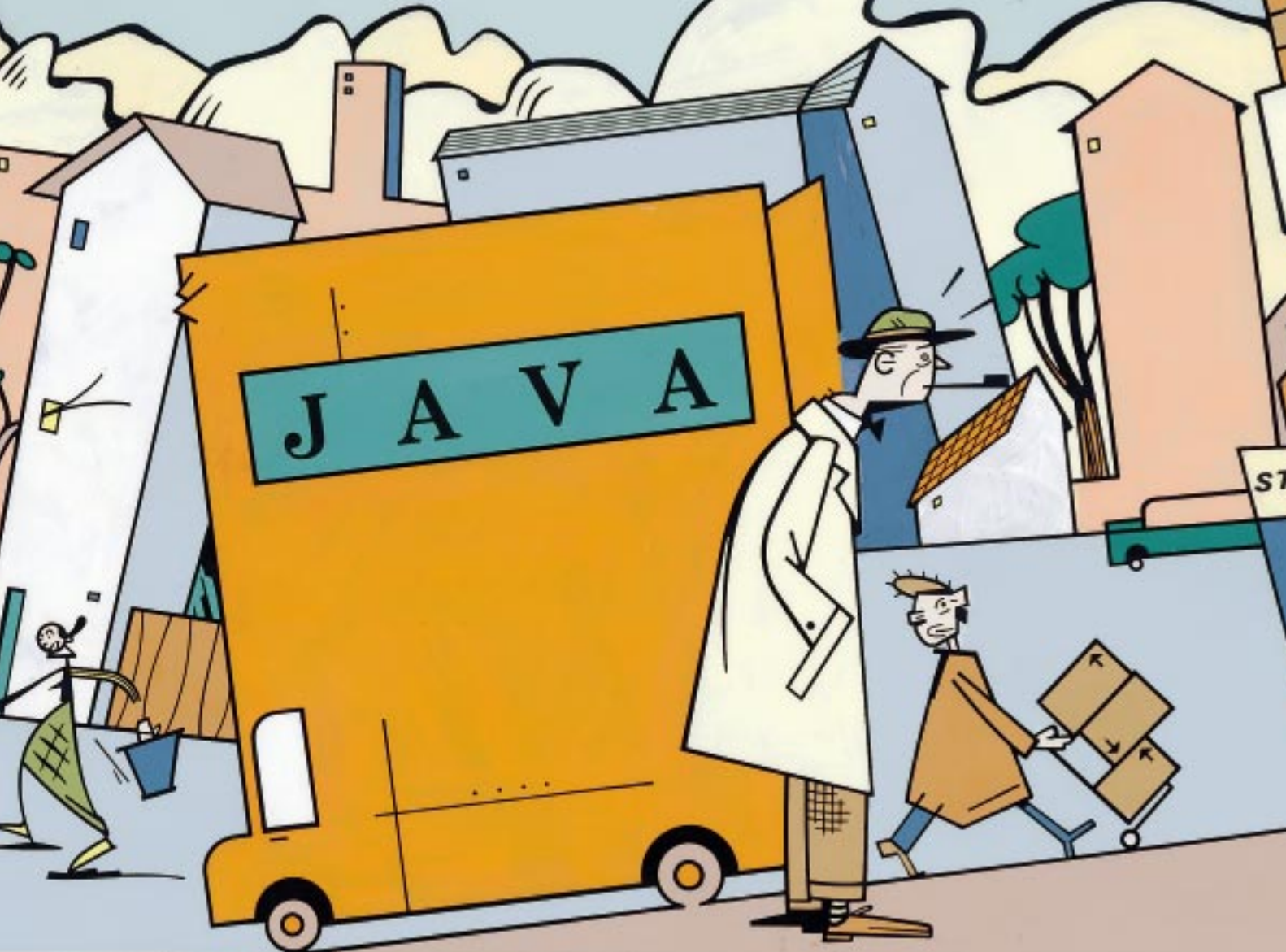
Table of features



Manufacturer	ANS	Choice	Codec	Dabs Direct	Intronet Solutions
Model	PCM4	Ultra Multimedia	Hermes	Atlantis Home Office	Solution Carousel
Price (inc VAT + delivery)	£999	£999	£999	£999	£999
Telephone	01744 883663	0181 993 9003	0181 664 8500	01942 794000	0181 660 3635
Fax	01744 883616	0181 993 9936	0181 664 8555	01942 790790	0181 660 3623
Web address	www.adv-net-sol.co.uk	n/a	www.codec.net	www.dabs.com	www.intronetsolutions.co.uk/solutions
Standard warranty	1yr on-site	2yr RTB 1st yr Pts+lab	3 yr CAR pts+lab	1yr onsite (+ 5yr lab)	1yr nxt day on-site
Options	3yr on-site	3yrs upgrade	Upgrade to on-site	Upgrade to 5yr onsite	3yrs on-site
Technical Support no.	0930 100800	0181 993 9003	0181 664 8500	01942 794230	0181 660 3635
Processor	AMD K6 -166	Intel P200 MMX	Intel PII 233	Intel P233 MMX	Cyrix 6x86MX 150MHz (P200)
RAM/type	32Mb/SDRAM	32Mb/EDO	16Mb/SDRAM	32Mb/SDRAM	32Mb/SDRAM
Hard disk	Fujitsu	Quantum	Fujitsu	Seagate	Seagate
Size(Gb)/interface	3.1Gb/EIDE UDMA	4.1Gb/EIDE UDMA	3.2Gb/EIDE UDMA	2.1Gb/EIDE UDMA	2.1Gb/EIDE UDMA
Motherboard manufacturer	QDI	Intel	Intel	Abit	Abit
Model/chipset	P51430TX/Intel 430TX	i430TX/430TX	AL440LX/Intel 440LX	PX-5/Intel 430TX	PX-5/Intel440TX
L2 cache/Max cache (Kb)	512/512	512/512	512/512	512/512	512/512
Spare bays 3.5/5.25in	1/1	1/1	1/2	1/1	1/1
AGP slot	○	○	○	○	○
PCI/ISA/shared	4/3/2	4/3/2	4/2/2	4/4/2	4/4/2
USB/Serial/Parallel/PS2	2/2/1/0	0/2/1/0	2/2/2/1	0/2/1/1	0/2/1/1
CDROM Manufacturer/model	Pioneer/DR-A24X	LG/CRD-8240B	Atapi/CDM-P523	Matshita/CR-585	Hitachi/CDR
CD speed/interface	24/IDE	24/IDE	24/IDE	24/IDE	16/IDE
Sound card manufacturer	MED	ESS	Yamaha (on-board)	Creative Labs	ESS
SC model	MED 3201	ESS MPU-401	OPL3-SA	Soundblaster16	ES1868
Speakers	Arowana (240W)	Contec (50W)	Supreme (50W)	Screen Beat Maxim 30	Typhoon 20W
Graphics card	S3 Trio Virge ExpertColor	S3 Virge DX	Cirrus Logic 5446	S3 Virge DX	S3 Virge/DX
RAM/Max RAM/type	4Mb/4Mb/VRAM	4Mb/4Mb/VRAM	2Mb/2Mb/VRAM	4Mb/4Mb/VRAM	4Mb/4Mb/VRAM
Monitor model/size	Adi Provista/15in	Hansol E15AL/15in	Smile/15in	Belinea 10 50 35/15in	Hansol E15AL/15in
Max refresh rate @ 1024x768	85Hz	70Hz	85Hz	85Hz	70Hz
Modem speed (Kbps)	56	33.6	56	33.6	33.6
Model	Rockwell K56 Flex	Choice 336	ASK 56k P'n'P	Typhoon 336	Supra 336
Bundle	MS Works	Lotus SmartSuite97	Intel LANdesk Management Adobe Acrobat Headset	Logic3 PC Strike joystick Europress Games Factory Lotus SmartSuite97	Logic3 Tracer joystick Boeder Headset Lotus SmartSuite97
Printer	○	○	○	Canon BJC-250 inkjet	1-Stop CD-Shop Epson Stylus Color 300
Year 2000 compliant?	●	●	●	●	●
● Yes ○ No					

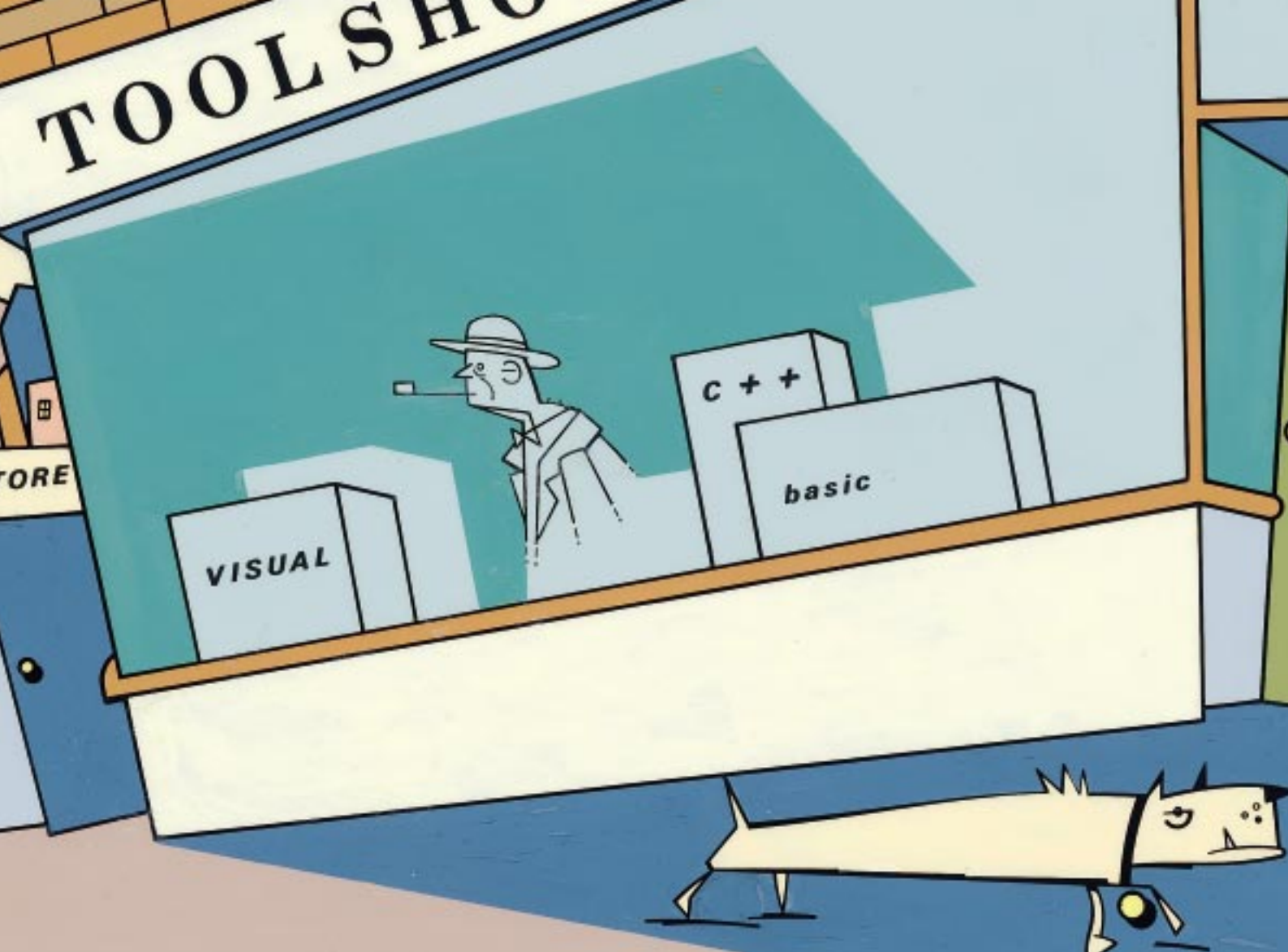
Table of features

					
					
Manufacturer	MBC	Mesh	Protek	Systek	Watford Electronics
Model	Ultimate	Elite Professional PII233M	Protek UltraMX	Powerstation	Aries Promedia TX98
Price (inc VAT + delivry)	£981	£999	£999	£999	£999
Telephone	0181 208 2333	0181 452 1111	0500 127498	01323 520111	01582 745555
Fax	0181 452 6522	0181 208 4493	0500 127499	01323 520267	01582 488 588
Web address	www.mbc1.co.uk	www.meshplc.co.uk	n/a	n/a	www.watford.co.uk
Standard warranty	1yr RTB lab+pts	2yrs pts+lab RTB	1yr pts+lab RTB	1yr RTB (Monitor 3yr onsite)	6yrs (12mth onsite) 5yr RTB lab
Options	On-site upgrade	2yrs on-site	n/a	upgrade to onsite	3yrs onsite
Technical Support no.	0181 208 2333	0181 208 2028	01392 861200	01323 520111	01582 745525
Processor	Intel P233 MMX	Intel PII 233	IBM 6x86MX 150MHz (P200)	Intel P200 MMX	Cyrix M2-233MX
RAM/type	32Mb/EDO	64Mb/SDRAM	32Mb/EDO	32Mb/EDO	32Mb/SDRAM
Hard disk	Quantum	Quantum	Fujitsu	Samsung	Quantum
Size(Gb)/interface	3Gb/EIDE UDMA	4.3Gb/EIDE UDMA	3.3Gb/EIDE UDMA	3.2Gb/EIDE UDMA	3.2Gb
Motherboard manufacturer	Intel	Asus	Intel	Titanium IB	Asus
Model/chipset	i430TX/Intel 430TX	P2L97A/Intel440LX	i430TX/Intel 430TX	P51430TX/Intel 430TX	TX97/Intel 430TX
L2 cache/Max cache (Kb)	512/512	512/512	512/512	512/512	512/512
Spare bays 3.5/5.25in	1/1	1/2	1/1	1/1	1/2
AGP slot	○	○	○	○	○
PCI/ISA/shared	4/3/2	4/4/2	3/4/2	4/4/06	5/3/06
USB/Serial/Parallel/PS2	0/2/1/0	2/1/2/2	2/2/2/1	0/2/1/0	0/2/1/2
CDROM Manuf/model	Toshiba/XM 6102B	TEAC/CD-524E	LG/CRD8250B	Samsung/SCR2431	LG/CRD8240B
CD speed/interface	24/IDE	24/IDE	24/IDE	24/IDE	24/IDE
Sound card manufacturer	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs
SC model	AWE64	SoundBlaster Vibra 16	SoundBlaster 16	SoundBlaster16 Vibra	AWE64
Speakers	Turando120W	Contec 50W	JUSTer Multimedia	Typhoon 25W	Aries Multimedia
Graphics card	Ati 3DCharger	Ati Xpert@Work (on-board)	Diamond Stealth 3D 2000 Pro	Graphics Blaster Extreme	Matrox Mystique Powerdesk
RAM/Max RAM/type	4Mb/4Mb/VRAM	4Mb/4Mb/SGRAM	4Mb/4Mb/VRAM	4Mb/8Mb/SGRAM	4Mb/4Mb/VRAM
Monitor model/size	OptiquestV655/15in	Adi ProvistaE40/15in	Videal/15in	Hansol500P/15in	CTX1562S/15in
Max refresh rate @ 1024x768	85Hz	75Hz	60Hz (@800x600)	85Hz	60Hz
Modem speed(Kbps)	56	33.6	33.6	56	56
Model	Pace	US Robotics	KTX	Systek 56 modem	Rockwell 56k
Bundle	Lotus SmartSuite97 BT Online CD Demon CD	Pipex Trial Dial Free Internet Access		Lotus SmartSuite97	Luckman Internet CDs Connect2 CD Compton software bundle
Printer	○	○	HP DeskJet 400	○	Lotus SmartSuite97
Year 2000 compliant?	●	●	●	●	●
● Yes ○ No					



Tools paradise

A whole crop of tools that allow you to develop Windows and Java applications on the PC, are picked and tested by Tim Anderson.



The internet has changed the way people use computers. No surprise then that development tools are changing as well. The obvious example is Java, which has come from nowhere and has become what many feel is the language of the future. Not wanting to be left behind, old stalwarts like C++ and Visual Basic have also acquired web features. It is exciting stuff, but back in the real world most development is still for Windows in its various guises. This group test looks at the whole range of tools available to developers, including leading Java environments as well as the main Windows offerings.

Java is the main talking point, but delivered, working Java applications are still thin on the ground. Having said that, there has been an explosion of web applications, software that uses a browser at the front end and some kind of web server at the back. Such applications are driven by a technological concoction, including HTML; Java applets; JavaScript or VB Script running on the client, the server, or both; CGI scripts; ActiveX; and server applications

using the Microsoft or Netscape API. Behind everything else there is often a SQL database such as Oracle, DB2 or SQL Server.

Whatever your chosen tool may be, you need to think about how it can work in this kind of environment and we have taken care to highlight the internet capabilities of each product reviewed. We have not neglected more traditional considerations, including ease of use, speed of development, system requirements, reliability, the performance of the final code, and what support is available from third-party components.

The other key feature is database support. The majority of custom applications use some kind of database.

Whatever your preferred language may be, choosing the right combination of development tool and database engine is critical for successful development.

We also take a look at the new wave of Java tools for intranets and delve into a couple of the hottest debates in programming: competing standards and the never-ending Microsoft-Sun Java battle.

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Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

Borland JBuilder

Delphi is a great product, and JBuilder is the nearest thing to Delphi for Java, so developers had high hopes of Borland's Java product. Borland waited for JDK 1.1 and the advent of JavaBeans, on the grounds that this technology is essential for the component-based approach favoured by the company. JBuilder and the JBCL (JavaBeans Component Library) are the outcome.

The first thing you notice about JBuilder is its speed — or rather, the lack of it. Borland has achieved the worst of two worlds, using mostly Java code for the IDE but writing some sections in Delphi. This gives it slow performance while keeping it Windows-specific. The answer is not to consider JBuilder unless you have lots of RAM, and 64Mb is not enough in our experience. If you have Windows NT, a Pentium 166 and 96Mb or more RAM, JBuilder starts to work sensibly. That said, it is still slower than rivals such as Visual Café. Also, JBuilder is not as robust as Delphi and screen corruption is a problem. Make sure you have the latest version and save your work frequently.

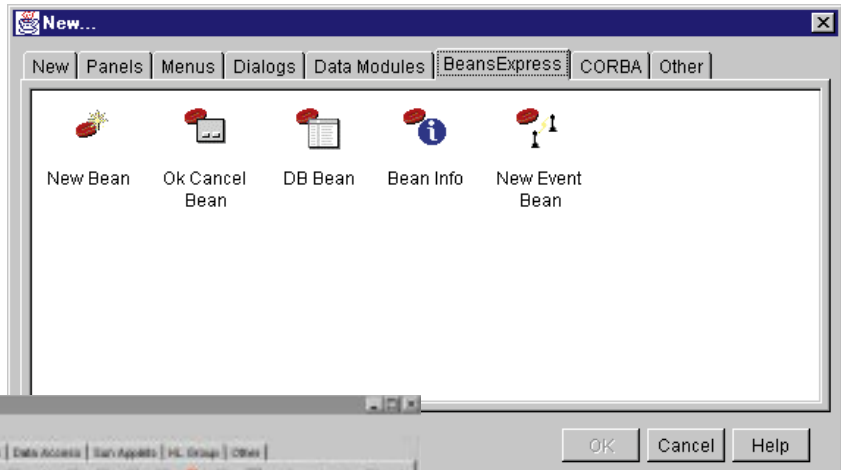
Once installed on a suitable machine, there

and choosing Show Hierarchy from a pop-up menu. The right-hand pane is for content and includes a source code editor, a design view for visual form editing, and a Doc pane which displays the JavaDoc reference generated from the Java code. The AppBrowser works well, but the property inspector and help viewer are still floating windows.

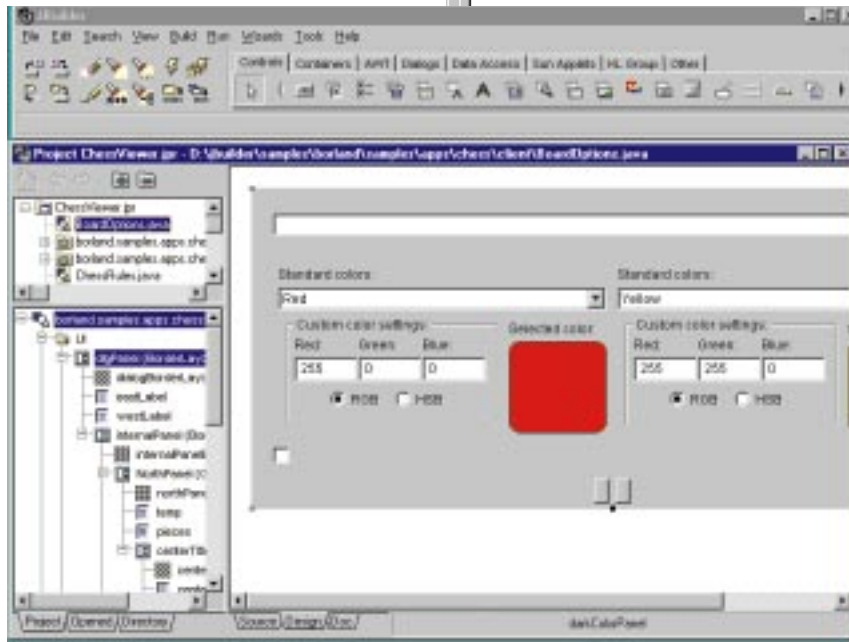
When you have a form selected, you can see either its source code or the visual design

AppBrowser, making you think that JBuilder had crashed when in fact it was just the Z-order that was skewed.

The client-server edition of JBuilder comes with DataGateway, a middleware server that works in a similar way to Symantec's dbAnywhere. It enables Java clients to connect to databases using JDBC and an all-Java client. The Java client connects to DataGateway (running on Windows 95 or NT),



Above The Object Gallery showing the Beans Express tab for growing your own beans



Left JBuilder's AppBrowser does a good job of managing your project. You can easily flip between source code and design view

is a lot to admire. Projects in JBuilder start when you open a tabbed dialog called the Object Gallery and choose a new application, applet or blank project. The Object Gallery offers interesting options like BeansExpress for building new beans, and wizards to create CORBA-compliant interfaces for distributed objects. The new project then opens in the AppBrowser, a multi-pane, multi-tabbed window which manages the project contents. The AppBrowser is Borland's answer to the mess of overlapping windows which IDEs often suffer.

Top left is a project tree which shows the project's files. Underneath it is a structure pane which looks inside the files to show classes and methods. This can be turned into a full-class browser by right-clicking a .java file

surface, and if you edit one, the change is immediately shown in the other. You can also drop components from the component palette onto the form. There is an interaction wizard that helps you generate code for the interaction of one component with another. There are wizards for overriding methods and for bundling resource strings. A deployment wizard handles the useful task of identifying the files needed for deployment and archiving them if required in a JAR or ZIP file.

Finally, a particularly neat wizard converts an applet into a JavaBean component, exposing its parameters as properties. The resultant bean can then be installed on the component palette. One irritating problem we had with the wizards was that the dialogs sometimes appeared behind the

which in turn connects to a variety of databases using BDE (Borland Database Engine). One advantage over Visual Café is that DataGateway is not so tightly integrated into JBuilder that it is difficult to use other JDBC drivers if required.

There are two forms of online help in JBuilder: the JavaDoc tab in the AppBrowser, which works very well; and a separate help viewer containing several books in HTML format. This also works well but is fairly slow, and the search facility only covers the currently displayed page, leaving you entirely reliant on the index and hyperlinks to find what you need.

PCW Details

Price Standard Edition £96.35 (£82 ex VAT), Professional Edition £458.25 (£390 ex VAT), Client-Server Suite £1,975.18 (£1,681 ex VAT)

Contact Borland 0800 454065
www.borland.com

Good Points Rich functionality. Strongly centred on JavaBeans. Makes Borland Database Engine available to Java.

Bad Points Slow performance. Troublesome bugs. No full-text search in online help.

Conclusion Nearly a great Java product, but not ready yet.

★★★

Personal
Computer
World
**Editor's
Choice**

Symantec Visual Café 2.0

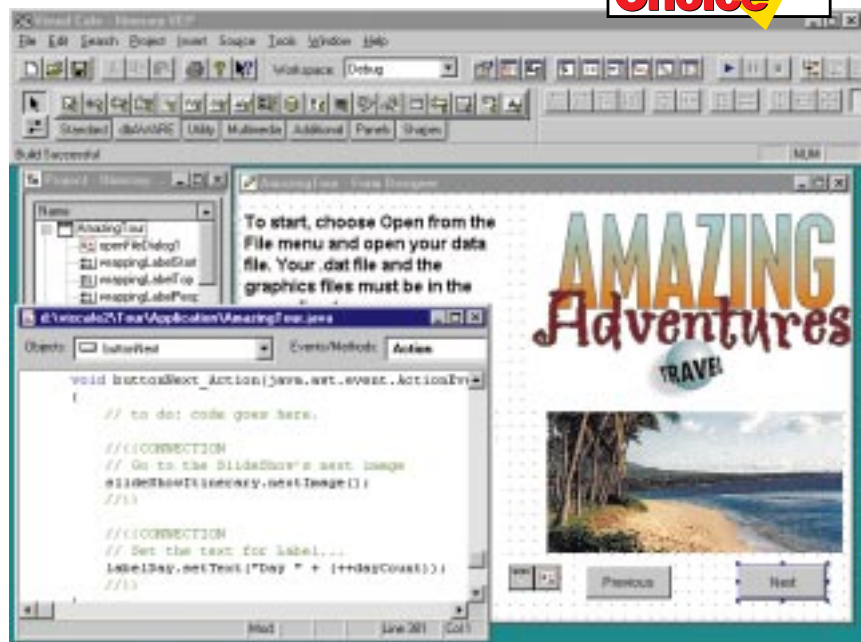
Symantec's Visual Café was one of the first tools to offer visual Java development and is now at version 2.0. This is for JDK 1.1 only, although the older version is still available if you need JDK 1.02 support. Alongside the visual IDE, Visual Café includes Symantec's JIT (Just in Time) compiler for Java, a native code Java compiler for Windows, the dbAnywhere middleware server which supports JDBC, and a web-authoring tool called Visual Page. Visual Café itself is a Windows application which, despite its impurity, is currently the best option for performance and productivity.

The Visual Café IDE offers the usual component palette, form designer and property inspector. The contents of the palette are determined by the component library, Visual Café's repository for JavaBeans and project templates. Adding your own components to the palette is a two-stage process, as you first add them to the component library and then to the component palette. A full range of standard, multimedia and data-aware widgets are supplied.

When you start a new project, you choose from the available project templates which, as supplied, include applet, application, Java bean, Windows DLL, Windows graphical application, and data-aware projects. The Windows projects are 32-bit only. Assuming the project is form based, you then select

components from the palette and write code to add functionality. Visual Café has a productivity tool similar to that in IBM's VisualAge. This Interaction Wizard lets you drag one component to another and choose both an action and a response. The generated Java source code is then available for viewing and editing as required.

Database support is through standard JDBC connections to the Symantec dbAnywhere middleware server. dbAnywhere has its own native drivers for popular SQL databases including Microsoft SQL Server, Oracle, Sybase and Informix, and also supports ODBC. The dbAnywhere server removes the need for client-side drivers, providing a middle tier between the front-end and the database server itself. If you get the Database Development Edition of Visual Café, you are allowed up to 25 simultaneous connections to dbAnywhere before a further licence is required. This approach is effective and practical, but the extent to which Visual Café is hooked into dbAnywhere is uncomfortable. Not all Java developers will want to use it, and the data-aware features of



Above Adventures with Visual Café. This simple application is not connected to a database but loads images directly from disk. **Left** The Interaction Wizard is Visual Café's way of drag-and-drop programming



Visual Café depend on it. If you want to use other JDBC sources, you are on your own.

Visual Café 2.0 is one of the best-performing Java environments, thanks to the excellence of its compilers. The JIT compiler kicks in automatically and provides a substantial boost, although there is no licence to distribute it with your applications. With the Professional or Database editions you can compile to native Intel code for a permanent performance gain. This does not make Visual Café a good alternative to Delphi or Visual C++ for native Windows development since, if you want to produce Windows-specific applications, there is no point in limiting yourself to the features of Java. Where it does make sense is getting better performance out of a cross-platform Java application when it is deployed on Windows.

The debugger sports a nifty feature called incremental debugging, which lets you edit the code during the course of a debug session. Visual Basic programmers can do this as well, but the Visual Café technique is even more flexible. If you edit an active method in break mode, a dialog appears with

options to continue regardless, restart the application or restart the method. The latter is often the ideal solution. For incremental debugging you need the Professional edition.

Bundled with Visual Café is a web-page authoring tool called Visual Page. It is good, with an elegant graphical interface along with a colour-coded HTML source editor. It is not the last word in web-authoring features, but does support frames and has useful insert dialogs for tables, applets, JavaScript files and multimedia elements.

Unlike PowerJ, Visual Café does not appear sympathetic to Microsoft's web technology. There is no place for VB Script or ActiveX in Visual Page, and Visual Café itself understands the JAR archive format but not Microsoft's CAB. It is not an enormous loss, however, since most web developers are keen to stay with features supported by both Netscape and Internet Explorer.

PCW Details

Price Web Edition £79 (£68 ex VAT), Professional Edition £231.48 (£197 ex VAT), Database Edition £408.90 (£348 ex VAT)

Contact Symantec 0171 616 5600
www.symantec.com

Good Points Easy-to-use interface. Excellent JIT and native code compilers. Incremental debugging improves productivity.

Bad Points Too closely tied to dbAnywhere middleware server. Supports JDK 1.1 only. A poor choice for Internet Explorer development.

Conclusion The most productive visual Java tool.

★★★★

IBM VisualAge 1.0

VisualAge Java is part of a product family that started with SmallTalk, a classic object-orientated language that has never quite made it into the mainstream. There is also VisualAge C++ and VisualAge Basic, and the products are available for OS/2 as well as Windows 95 or NT.

An interesting feature of VisualAge Java is that the IDE is built in SmallTalk. Like Java, Smalltalk is interpreted, and IBM has developed what it calls the Universal Virtual Machine that can run both. This does mean that VisualAge Java runs sluggishly and, like so many Java environments, requires a hefty system. Do not let this put you off: VisualAge is an excellent product. It is also the only Java tool that does genuine visual programming, by displaying the connections between objects as well as generating code.

The VisualAge workbench is tightly integrated. It takes the form of a single, tabbed window with a toolbar and menu. All Java code and projects are stored in a repository and, rather than opening project files, you navigate to them. When you want to deploy an



application, you have to export it to the file system, in JAR format if you choose. Version control is built in. To start a new project, you choose Add Project, add a package and then start adding classes. Or you can use a SmartGuide to walk you through creating a new Applet. VisualAge is entirely based on JavaBeans, and to create a visual interface you build a composite bean in a visual composition editor, which lets you place existing bean components from the palette and create connections between them.

Other strong features of VisualAge Java include a superb class browser and a

comprehensive debugger. Online help is in HTML and displays in the default browser. The help is extensive and the search is done properly, with a bundled web server and intelligent search engine, although installation can be tricky. Database tools are only available in the Enterprise version, and take the form of builders that generate beans to access JDBC/ODBC. There are also builders for RMI and accessing native C++ DLLs.

PCW Details

Price Professional £77.55 (£66 ex VAT), Enterprise £1,468 (£1,250 ex VAT). Demo free from www.software.ibm.com

Contact IBM 01329 242728 www.ibm.com

Good Points Superb class browser. Built-in repository. Truly visual and object orientated.

Bad Points Slow IDE written in SmallTalk. Visual Composition Editor can get cluttered. No context-sensitive help.

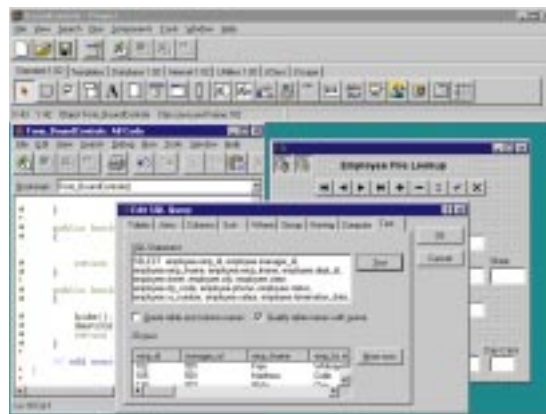
Conclusion It is a way of working that will not suit everyone, but if your system is up to it you should definitely look at VisualAge Java.

★★★★

Sybase PowerJ

PowerJ illustrates why working with Java is not yet the one-stop solution the hype sometimes suggests. PowerSoft has chosen to provide the maximum possible compatibility, and the result is perplexing. There are two component libraries, one for JDK (Java Development Kit) 1.02 and one for JDK 1.1. You can choose whether to use the Microsoft or Sun JVM (Java Virtual Machine) and unlike early versions you can debug with either JVM.

If you work with Microsoft's JVM you can use ActiveX controls, but not with Sun's JVM. You can compile with PowerSoft, Microsoft or Sun compilers. You can deploy with either CAB archive files, for Internet Explorer, or JAR files, Sun's official Java standard. It is an impressive compatibility effort, but Sun is now hard at work on JDK 1.2 and there will soon be pressure to support Swing, the Java Foundation Classes. Even so, if you want a Java tool with maximum choice over which variety of Java to target, PowerJ is the best choice. There is also a bundle of third-party components and classes, from JSCape, KL Group and ObjectSpace.



Testing a query in PowerJ. In this case, it is connecting to the bundled SQL Anywhere

Observant users will notice that the main PowerJ executable is actually called OPTIMA.EXE. Optima was the original name for what is now Power++. As this suggests, the two products have a lot in common: PowerJ has the same IDE, including a component palette, form designer, and the Reference Card for drag-and-drop programming. Actually, PowerJ has two component palettes, one for JDK 1.02 and one for JDK 1.1. When you set the project target, by changing run options, the component palette automatically changes to match.

PowerJ includes support for databound controls and database connections through JDBC. It offers a variety of JDBC drivers, using various kinds of middleware. JConnect provides native access to Sybase databases such as Sybase SQL Server and SQL Anywhere, a version of which is bundled, although to use SQL Anywhere you also have to run gateway software called Open Server Gateway. An option is XBD JetConnect, which bridges to ODBC, or Visigenic VisChannel, which uses the CORBA-compliant IOP protocol. Or use NetImpact Dynamo, a server app which has database queries and returns results as HTML. These are included but usually additional licences are needed.

PCW Details

Price £1,821.25 (£1,555 ex VAT)

Contact Sybase 01628 597100 www.sybase.com

Good Points Maximum flexibility over target platform. Strong visual tools. Good db support.

Bad Points No DataWindow yet. Flexibility can be confusing. No native code compiler.

Conclusion Expensive, but the best choice for targeting JDK 1.02, 1.1 and Internet Explorer.

★★★★

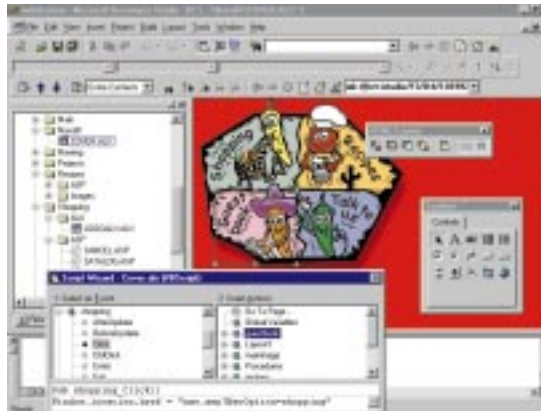
Personal Computer World
Highly Commended

Web applications: the new wave of development

The web is forcing change on how application development is done. Increasingly, your target platform will not be Windows, Unix or even Java, but the web, whether in its world wide or intranet guise. Put another way, the platform is now a network and all applications are distributed applications. The key elements are likely to include a back-end database server, a web server, and a browser-hosted client reading HTML and possibly running scripts, Java Applets or ActiveX controls. In addition there may be database middleware, object brokers and/or transaction monitors.

Managing that lot takes more than a C++ or Java compiler, and the skills needed range from traditional SQL to page design and authoring skills. A few products are appearing which aim to make sense of this scenario and to provide the range of tools needed. One is MS Visual InterDev, a tool for Internet Information Server which uses Active Server Pages, essentially HTML into which server-side scripts are embedded. Another ambitious product is Haht Software's Hahtsite, which mixes web authoring, site management, database access, and server-side programming in Basic or Java.

Java Workshop deserves special mention because it comes from Sun, the owner of Java. Java is a Sun trademark, which explains



The next generation: web application tools. This is MS Visual InterDev

why this is the only product to include the word in its title. The package offers visual Java development with full support for JDK 1.1 and JavaBeans. It is inexpensive and comes with a slim manual written in a chatty style. Clearly, Sun is aiming for the same ease of use that Microsoft achieved with early versions of Visual Basic. Central to this strategy is the JavaBeans technology, enabling component-based application development.

Java Workshop is built entirely in Java, although it will only run with its own tweaked version of Sun's JDK. Version 1.0 was a great proof of concept, but slow and awkward to use. Version 2.0, tested on Windows NT 4.0,

is a great improvement although still sluggish. It includes a GUI builder and a JavaBeans component palette, syntax highlighting editor, debugger and profiler. A powerful feature in the GUI Builder is the Edit Operation button that appears in the attributes sheet for each component. This performs a similar duty to the Reference Card in PowerJ or the Interaction Editor in Visual Café, letting you generate code by clicking your way through dialogs. The environment has more the feel of a browser than a conventional IDE. It is an interesting product, but performance is still so poor that it is barely usable. Unfortunately for Sun, it is not a good advertisement for Java.

PCW Details

Microsoft 0345 002000 www.microsoft.com
 Contemporary Software (UK distributor of Hahtsite) 01344 873434
www.comtemporary.co.uk
 Sun 0171 628 3000 www.sun.com

Objects and components

ActiveX versus JavaBeans

The product that pioneered reusable code was Visual Basic with its VBX add-ons. The VBX is now dead, but Microsoft's replacement, ActiveX, is alive and kicking. ActiveX components are native code executables which can be embedded into any compatible application or document. Communication between the component and its host is done through a specification and mechanism called COM (Component Object Model). ActiveX gets a bad press from the net community because it has no security model other than digitally-signed code, and because most controls run only on Windows. In its favour is good performance, due to most ActiveX components being native code executables.

Java has its own component spec, called JavaBeans. Beans are classes which conform to this specification and can be used in a similar way to ActiveX components. They can be installed on a palette, inserted into an application by click-and-drag and customised by setting properties. They generate events at runtime, and you can write code to run in response to those events. JavaBeans is a great technology for application development with Java, and the latest batch of Java tools uses it extensively. Assuming Java's momentum is

sustained, you should expect a strong third-party market to develop, as it did for the VBX.

Distributed objects

In an increasingly connected world, distributed applications are becoming common. A distributed application is one in which code executes on more than one machine. The benefits are better performance, gained by balancing the load across different systems, and applications that are easier to maintain because you can keep the code that is likely to change in one location. TP (Transaction

Processing) monitors also play a part, by managing multiple incoming requests from clients. The object-orientated way to do distributed apps is to use distributed objects, which can be instantiated remotely, having their methods called over the network or the web. The Microsoft solution is Distributed COM, which lets you create COM objects remotely. Once DCOM is installed any COM object can be remote, but each remote component must be registered on the client machine.

Java has its own ideas about how to distribute objects. The most simple is RMI (Remote Method Invocation), a Java-to-Java system. Clients instantiate remote Java objects and can use them like any other Java object. RMI is useful, but Java supports CORBA (Common Object Request Broker Architecture), a standard defined by the OMG (Object Management Group) set up to promote the cause of distributed objects. CORBA objects expose an IDL (Interface Definition Language) which enables a piece of middleware called an ORB (Object Request Broker) to handle communication between objects. Unlike RMI, CORBA is language-neutral. Java has been a shot in the arm for CORBA, which has been around for years without much success in real-world adoption.

Object Wars: CORBA is finally catching on





Microsoft Visual C++ 5.0

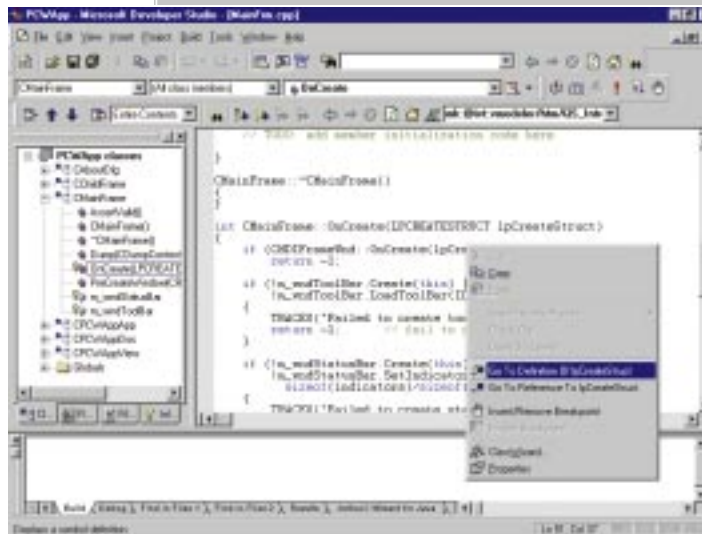
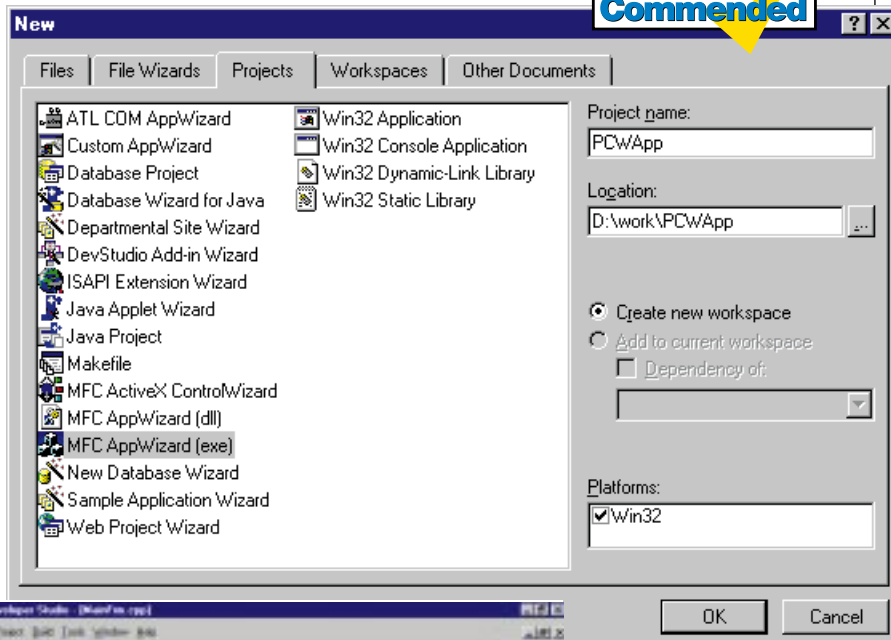
Working for Microsoft, the developers of Visual C++ have the advantage of inside information about how to create Windows executables. Windows itself is constantly being updated and extended, and Visual C++ is generally the first development tool to support new features.

The Visual C++ package includes not only a C++ compiler, development environment and tools, but also MFC (Microsoft Foundation Classes), a class library for programming Windows. MFC is designed to be a thin wrapper for the Windows API, aiming more for efficiency than for elegance or convenience. MFC is not designed for full visual programming in the same way as Borland's VCL or PowerSoft's Component Library. What it does is provide a comprehensive Windows class library along with an application framework that simplifies tasks like opening and printing documents. There are other C++ compilers that use MFC but it is Visual C++ that has the most up-to-date version.

The Visual C++ IDE is called Developer Studio and is a substantial application in its own right. The same environment is used for Visual InterDev and Visual J++, and eventually others like Visual FoxPro and Visual Basic are likely to be hosted there as well. Its purpose is to provide integrated access to functions such as online help, resource editing, class browsing, code editing, compiling and debugging. The environment makes extensive use of tabbed and docked windows so that all these features are neatly contained. The downside of this approach is that the amount of screen available to each window is reduced and a large display area is essential.

Work with Visual C++ starts with the New Project dialog. This presents an extensive list of project types, the exact contents depending on which tools and add-ons are installed. Choosing a project kicks off a wizard that lets you customise the project. For example, the MFC Application wizard has an array of COM options, including all the combinations of server, container and automation support. You can also add toolbars, status bar, print preview, most recently used file list and other standard features. Visual C++ then generates source code for the application. Compile and run, and there is an impressive but useless shell application. It is up to you to write the C++ code that adds real functionality. Visual C++ does not abandon you completely, though.

The Class Wizard is an excellent tool for creating new classes in MFC applications, making light of the tricky job of catching and responding to Windows messages. When you add a class to an application, it is listed in the class view tab of a workspace window, with methods shown in a tree view. Double-clicking a method opens the code for editing.



Above With each release, the Visual C++ project wizards get more diverse

Left Visual C++ has the slickest IDE, but you need a large display to enjoy it

documentation. If you install the Microsoft Developer Network library, this is also conveniently hosted by Visual Studio.

Microsoft has done a good job. The problems with Visual C++ are that it has demanding system requirements and provides traditional C++ programming with a rich array of utilities

rather than the high productivity of a RAD product such as Visual Basic, Delphi or Power++. Not all developers want to work with MFC, and Visual C++ is probably not the best product for compiling the Standard Template Library, although it is supported. For the professional Windows developer, Visual C++ is essential.

There is also an integrated resource editor. From the ResourceView tab of the workspace window you can edit or add resources such as dialogs, menus and string tables. Each resource has its own editor, and the dialog editor supports ActiveX controls as well as standard Windows objects. It also links to the ClassWizard, so you can easily add a button to a dialog visually and then use the Wizard to write code for its click event.

The Visual C++ code editor understands C++, HTML and VB Script, and is extensible so that if you install Visual J++, for example, Java is added to the list. There is syntax highlighting and automatic indentation, and tooltips are supported so that, during debugging, hovering the mouse over a variable reveals its value. You can write VB Script macros to automate your work and customise the Tools menu to add your own commands to run external utilities. Online documentation is based on HTML, and the integrated InfoViewer gives searchable access to an outstanding set of resource books including guides, tutorials, references and Windows

PCW Details

Price Learning Edition £84.60 (£72 ex VAT), Professional Edition £442.98 (£377 ex VAT), Enterprise Edition £1,079.83 (£919 ex VAT)

Contact Microsoft 0345 002000
www.microsoft.com

Good Points Mature. Best for the latest Windows features. Integrated online documentation.

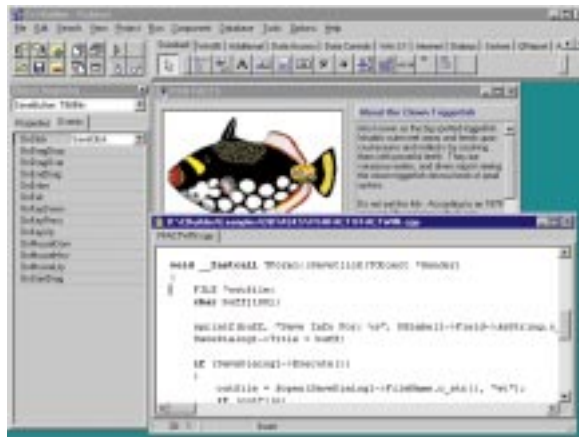
Bad Points Demanding system requirements. MFC is complex to learn. Not a RAD tool.

Conclusion The premier C++ tool for Windows.

★★★★★

Borland C++ Builder

The main point to make is that this *is* Delphi. The resemblance is not just superficial; both use the same VCL (visual component library), although in C++ Builder it corresponds to Delphi version 2.0 whereas Delphi itself is now at version 3.0. The VCL has not been converted to C++ but remains a Pascal library. The clever bit is that C++ Builder can happily compile both C++ and Pascal code, and header files allow the VCL to be used as if it were C++.



Is it Delphi or is it C++? It's both, so it must be C++ Builder

On the surface, C++ is all you see. What you get is a proven visual development tool that uses C++ rather than Pascal. For C++ developers looking for greater productivity, it is outstanding. You get full access to the Borland Database Engine, with SQL links to native drivers for client-server applications.

There are a couple of problems with C++ Builder. Firstly, it is to some extent Delphi's poor relation, still a version behind a long time after the release of Delphi 3.0. Developers may be better advised to learn Pascal rather than pick up C++ Builder. Secondly, although

strong as a visual development environment, it is weak when considered purely as a C++ IDE. For example, there is no class expert as in Borland C++ 5.0, for browsing and creating classes. No resource editor is supplied, although there are command-line resource tools. In other words, C++ developers may miss the features of traditional IDEs, while enjoying the quick development that C++ Builder offers. Thirdly, the use of Pascal for the Visual Component Library is not ideal. Browsing the VCL source is near-essential for advanced projects, and this means that to get

the most from C++ Builder developers will need to pick up some Pascal skills.

Borland has taken to bundling C++ 5.0 with C++ Builder and plans to merge them in the long-term. It is a similar strategy to that of Sybase/PowerSoft, who are focusing attention on the Power++ RAD environment rather than going head-to-head against Microsoft Visual C++ with a traditional C++ product. C++ Builder and Power++ offer productivity that is ahead of previous C++ tools, with Borland's product having the better component library and Power++ winning if you need ODBC database connectivity.

PCW Details

Price Learning Edition £45.83 (£39 ex VAT), Professional Edition £457.08 (£389 ex VAT), Client/Server Edition £1,488.73 (£1,267 ex VAT)

Contact Borland 01734 320022
www.borland.com

Good Points Delphi's productivity for C++ developers. Rapid visual development.

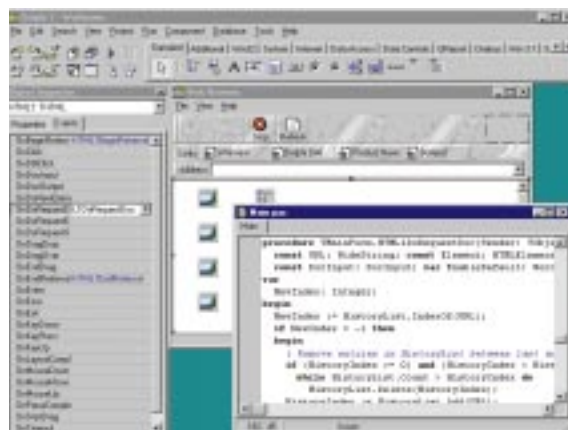
Bad Points A version behind Delphi. Weak ODBC connectivity. No class browser or resource editor.

Conclusion Genuine RAD for C++, spoilt by a few irritating problems.

★★★★

Borland Delphi 3.0

Time and again, Delphi comes out the winner in comparative tests. The reason is that it is the most successful at combining the productivity of a RAD tool with the flexibility of a C or C++ compiler. From the first version it has offered full native code compilation which, unlike the equivalent feature in Visual Basic 5.0, does not require a runtime support library. The development environment is tidy and efficient, letting you design applications by dropping components onto forms and setting their properties. These



Borland's Delphi, still the leading RAD tool for Windows

components can be native Delphi code or ActiveX controls. It is thoroughly object orientated and supports inheritance, encapsulation and polymorphism. Unlike Visual Basic, Delphi has proper error handling with exceptions and try ... finally blocks. The compiler is extraordinarily fast and most access to the Windows API is transparently easy. There is full integration with the BDE (Borland Database Engine) providing native support for Paradox and dBase, plus SQL links for server databases, plus the ability to use ODBC. In other words, most of what

developers need is there in Delphi. The level of satisfaction among users is high.

Delphi does have weaknesses. The BDE is fine with native drivers but not the best when it comes to ODBC or Microsoft Access data. By way of compensation it is possible to get third-party plug-in replacements for the BDE specifically for these formats. The development environment is not as rich as that in, say, Visual C++. A class browser would be a welcome enhancement. Object Pascal, the language of Delphi, has become bloated over the years and can be

confusing in areas like file manipulation where there are several ways to do the same thing. Delphi applications are thoroughly non-portable. Although there is good support for COM, Microsoft's component object model, both Visual C++ and Visual Basic are safer tools for this kind of work. Delphi's online manuals have never really come together. Finding your way around is not easy, and it is spartan compared to the rich, integrated online help in Microsoft's Visual Studio.

Delphi is not perfect but the fundamentals are correct. There is still no better general-purpose Windows development tool.

PCW Details

Price Standard Edition £95.18 (£81 ex VAT), Professional Edition £448.85 (£382 ex VAT), Client/Server Edition £1,617.98 (£1,377 ex VAT)

Contact Borland 01734 320022
www.borland.com

Good Points Rapid object-orientated development. Fast compiler. Native code executables.

Bad Points Weak with data in Access format. Poor online help. No class browser.

Conclusion The best product in its category.

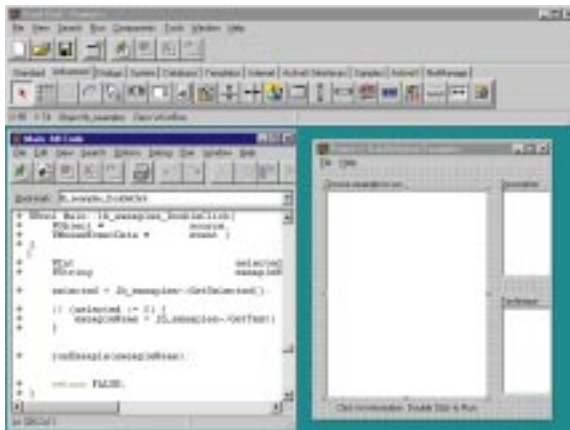
★★★★★



Sybase Power ++ 2.0

Power ++ competes with Borland's C++ Builder as a RAD tool which is also a real C++ compiler. The product was originally called Optima++ and is now in its second major version. If you do not like the thought of getting your hands dirty with Pascal, you will be glad to know that Power++ uses the C++ language throughout. It combines a component class library with a visual application builder that lets you place components from a palette onto a form, set their properties, and write code to build application functionality. There are also tools to help you create your own components, and good support for hosting ActiveX controls and creating COM client and server applications.

There are several features in Power++ that set it apart. One is the Reference Card, a combined class browser and programming wizard. When you drag an object from a form to the code editor, the Reference Card pops up to show the actions you can perform on that object. Selecting options and parameters from a series of dialogs enters the correct code. It is a useful learning feature, and for



experienced coders it prevents typing errors and saves remembering parameter lists.

The main strength of Power++ is in database work. It is not ideal for connecting to desktop data like dBase or Access, but as you would expect from Sybase there is excellent support for server databases, primarily through ODBC. There is also an ActiveX control that lets you use the DataWindow from PowerBuilder as part of your application. This component is really an application in its own right and comes with a 600-page printed manual. Sybase bundles a version of SQL Anywhere with the product,

Sybase Power++ combines RAD C++ with the PowerBuilder DataWindow

the exact specifications depending on which edition of Power++ you purchase. SQL Anywhere, formerly Watcom SQL, is a high-quality, lightweight SQL server database and makes a good alternative to desktop databases now that everyday PCs are sufficiently powerful to run this kind of configuration comfortably. Power++ is less robust than Delphi or C++ Builder in our experience. Another weakness is that you cannot easily create ActiveX controls.

PCW Details

Price Developer Edition £361.90 (£308 ex VAT), Professional Edition £724.98 (£617 ex VAT), Enterprise Edition £1,448.78 (£1,233 ex VAT)

Contact Sybase 01628 597100
www.sybase.com

Good Points Rapid development for C++. Reference Card class browser and coding wizard. Outstanding client-server database support.

Bad Points Hard to create ActiveX controls. Component class library not portable. Weak for desktop databases.

Conclusion Excellent choice for database work.

★★★★

Microsoft Visual Basic 5.0

Just how good is Visual Basic? Its detractors still call it a toy language, while Microsoft is happy to remind us that it remains the most popular Windows development tool by some distance. Version 5.0 squashed two of the main problems with the language, providing native code compilation and the AddressOf operator to solve Windows API limitations. You can also write your own reusable components without leaving Visual Basic. VB components are ActiveX controls so you can also use them in other environments that support ActiveX. In particular there is great integration with Microsoft Office, thanks to the use of Visual Basic for Applications throughout that all-conquering suite. For database work, VB has native support for Microsoft Access and excellent ODBC connectivity, making it a good choice for client-server systems. And despite all these talents, VB remains the easiest tool for beginners to programming.



MS Visual Basic, the most popular Windows development tool

While undeniably impressive, there are a few problems with VB. The most serious is that a typical Visual Basic application requires a large number of files and registry entries to be all present and correct, or it will not run. Even when compiled to native code, all Visual Basic applications need runtime files including the main MSVBVM50.DLL, whose name presumably stands for "Visual Basic Virtual Machine" in imitation of Java. It is not this file, but rather an array of ActiveX components, which cause deployment and troubleshooting

problems, particularly on systems which host a number of Visual Basic applications, or other applications using the same components. A niggle is that VB has a unique approach to object-orientation which lacks the completeness of C++ or the effectiveness of Delphi. Finally, Visual Basic has crude error handling, little changed from its first version, which makes it hard to create robust systems.

There are still good reasons to use Visual Basic. Third-party support is great and its integration with Office and Access is invaluable. You can build advanced distributed applications, using remote COM objects with Microsoft Transaction Server.

PCW Details

Price Learning Edition £82.25 (£70 ex VAT), Professional Edition £444.15 (£378 ex VAT), Enterprise Edition £1,078.65 (£918 ex VAT)

Contact Microsoft 0345 002000
www.microsoft.com

Good Points Easy to get started. Native Access MDB support. Flexible and powerful.

Bad Points Large runtime files. Deployment and version problems. Weak error handling.

Conclusion Powerful and sophisticated, but the simplicity and reliability of VB 3.0 is missed.

★★★★

Microsoft at war

The company that owns Windows is fighting a war on two fronts, and the outcome will profoundly influence the future of application development. One is Java. Sun, the company which owns Java, is pushing the concept of "write once, run anywhere" and the related idea of "100 percent pure Java." The two need to go together because, if a Java app calls native methods, it is no longer portable. Sun is developing new APIs for Java, lifting its limitations in the hope that eventually Java will dominate application development. The company now calls Java a platform rather than a language. Microsoft, by contrast, licensed Java in order to give Windows developers the benefit of Java's highly productive language features. Rather than implement the full range of Java APIs, Microsoft would rather limit Java to features that do not compete with Windows. The company has also implemented Windows-only features in Java, for example the JDirect mechanism for calling the Windows API, and RNI (Raw Native Interface) for calling native methods. Java advocates see this as an attempt to throttle the language in its formative years, while Microsoft claims it is merely making Java a better tool for Windows developers.



Sun blasts Microsoft over Java compatibility

The Microsoft advantage is the dominance of Windows on the desktop, while Sun and its Java partners have got the better of the PR war and the support of every company (and there are many) that sees Microsoft as a threat to its business. The truth is that neither Java nor Windows is going to fail in the foreseeable future, nor is Microsoft going to cooperate with its competitors' efforts to render Windows redundant. From the developer's perspective, it is a shame that Sun and Microsoft are unable to work

together, and a shame also that Sun is unwilling to relinquish control of Java and make it truly a non-proprietary standard. Although Sun has been given approval by the ISO (International Standards Organisation) to submit Java specifications for standardisation, Sun is retaining control of both the trademark and, more important, the maintenance of those specifications.

Microsoft's other area of conflict is with Netscape in the web browser market. Web applications are the wave of the future, irrespective of what happens to Java, and both companies understand that whoever controls the browser controls the platform.

This looks like a no-win situation for developers. If both browsers continue with substantial market share, the likely outcome is continuing standards wars, making it hard to support new features like Dynamic HTML. If one browser dominates, it gives the winner a frightening level of control over how people use the internet. The only glimmer of hope is that both parties profess support for the W3C, an independent body which controls the HTML standard. If the W3C succeeds in retaining and increasing its authority, we may yet get open and stable internet standards.

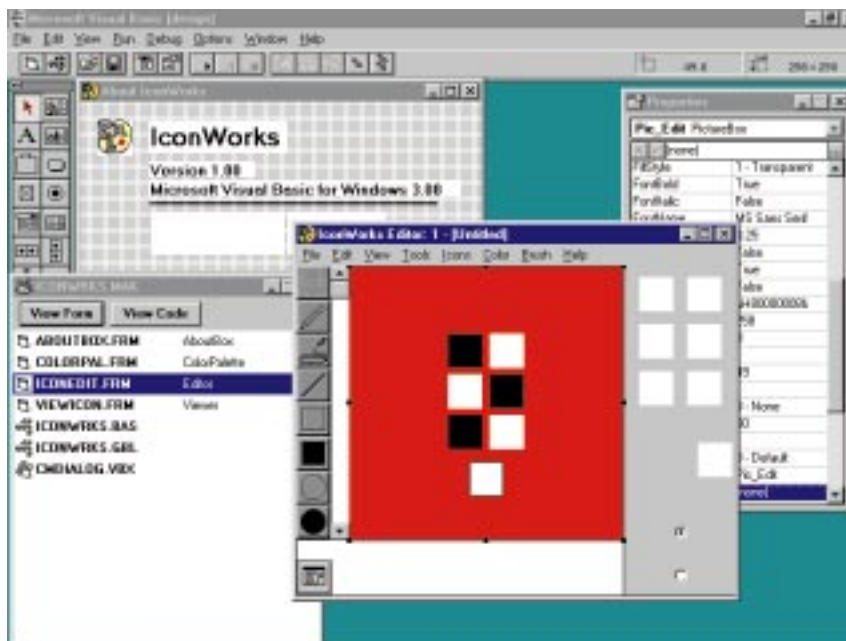
If you need Windows 3.1...

Despite massive Windows 95 hype, there are enormous numbers of PCs out there running Windows 3.1 or Windows for Workgroups. Many companies and users are reluctant to change, either because their hardware is not up to the job or because the risk of moving from a known, working configuration is too great. These sites need supporting, and there is still a market for 16-bit Windows solutions. Since 16-bit applications generally run well on Windows 95 and NT, some vendors still feel it is best to stick at that level. This decision does limit development choices. Most new tools need Windows 95 or NT, and Microsoft has all but abandoned the old Windows. Ironically, there is also an advantage in this. Unlike Windows 95 or NT, Windows 3.1 is a known and stable platform, at least in the sense that its features are no longer changing. There are still good tools around, and here are some key contenders:

Visual Basic 4.0 includes a 16-bit version, although VB 5.0 does not. VB 3.0 is still a great 16-bit tool and more lightweight than version 4.0.

Visual C++ 1.52, the last 16-bit version, is bundled with Visual C++ 5.0. Another complication is that version 4.0 supports Win32s, the libraries which give 16-bit Windows limited 32-bit compatibility, but the later 4.x and 5.x releases do not.

Borland C++ 5.x needs Windows 95 or NT to



Visual Basic 3.0 is five years old, but still popular for 16-bit development

run, but targets DOS, 16- or 32-bit Windows. This is the most flexible choice for handling all varieties of Windows.

Borland Delphi 1.0 is outstanding for 16-bit

Windows development. It comes in the box with Delphi 3.0.

Many vendors still sell older versions of their products for 16-bit compatibility.

Editor's Choice



There are plenty of tools now available which let you do drag-and drop, component-based development with Java and JavaBeans, but the truth is that none of the current crop of Java products are really satisfying. The most serious difficulty is the immaturity of Java itself. Compatibility is a serious problem, and the blame does not all lie with Microsoft. Sun is developing Java at breakneck speed, and currently neither visual development tools nor web browsers can keep up. The JDBC standard also presents problems, and it is hard to avoid expensive middleware products to connect successfully.

That said, and provided you are happy to give up JDK 1.02 compatibility, the **Editor's Choice** award goes to **Symantec's Visual**

Café which performs well, has strong database tools and the option of native code compilation for Windows. **PowerJ** is a good choice, for its flexibility in targeting Java platforms, and thoroughly deserves a **Highly Commended** award. JBuilder, VisualAge and Java Workshop are all promising but not yet mature enough to compete with the best.

Borland's Delphi takes the **Editor's Choice** award for Windows development. Although the language is a little more complex than Microsoft's Visual Basic, the tables are turned when applications become larger, with Delphi letting you do object-orientated, component-based development without requiring the services of COM, Microsoft's powerful but problematic component object

model. Better error handling and easier deployment complete the picture. A **Highly Commended** award goes to MS Visual C++, which has the best set of editors and online documentation, and the benefit of a close relationship with Windows.

It is worth remembering that Java is not the only way. There is merit in avoiding Java on the client and relying on server-side applications, in Java or other languages, which return standard HTML. The strength of products like Visual InterDev and Hahtsite is that they put the focus on web apps that combine components created with a variety of languages and tools.

Table of features



Java tools	Visual Café 2	JBuilder 1	VisualAge 1	PowerJ 2	Java Workshop 2
Supplier	Symantec	Borland	IBM	Sybase	Sun
Tel	0171 616 5600	0800 454065	01256 343000	01628 597100	0171 628 3000
URL	www.symantec.com	www.borland.com	www.ibm.com	www.sybase.com	www.sun.com
Prices ex VAT	£79/£249/£429	£82/£390/£1,681	£66/£1,250	£1,555	£99
Prices inc VAT	£92.83/£292.58/£504.08	£96.35/£458.25/£1,975.18	£77.55/£1,468.75	£1,821.25	£116.33
Database middleware	dbAnywhere	DateGateway (Client-Server)	CICS Gateway (Enterprise)	Jconnect	None
Native code compiler	●	○	○	○	○
JIT compiler	●	●	○	○	○
Profiler	○	○	○	○	●
Visual form builder	●	●	●	●	●
JavaBeans palette	●	●	●	●	●
JAR export	●	●	●	●	●
CAB export	○	○	○	●	○
Host ActiveX controls	○	○	○	●	○
Help format	Winhelp	HTML	HTML	Winhelp	HTML
JDK 1.02 support	○	○	○	●	○
JDK 1.1 support	●	●	●	●	●
Repository / version control	Third party support	PVCS	Built-in	Object Cycle	Third party support
CORBA support	○	●	○	●	○
Windows tools	Visual C++ 5	C++ Builder 1	Power++ 2	Visual Basic 5	Delphi 3
Supplier	Microsoft	Borland	Sybase	Microsoft	Borland
Tel	0345 002000	01734 320022	01628 597100	0345 002000	01734 320022
URL	www.microsoft.com	www.borland.com	www.sybase.com	www.microsoft.com	www.borland.com
Prices ex VAT	£72/£377/£919	£39/£67/£389/£1,267	£308/£617/£1,233	£70/£378/£918	£81/£382/£1377
Prices inc VAT	£84.60/442.98/1079.83	£45.83/78.72/457.08/1488.73	£361.90/724.98/1448.78	£82.25/444.15/1078.65	£95.18/448.85/1617.98
Language	C++	C++	C++	Basic	Pascal
Native code compilation	●	●	●	● with runtime	●
Native/bundled db engine	JET	BDE	SQL Anywhere	JET	BDE
Report designer	None	QuickReport	DataWindow	Crystal reports	QuickReport
ODBC support	●	●	●	●	●
Host ActiveX controls	●	●	●	●	●
Easy create ActiveX controls	●	○	○	●	●
Supports active template lib	●	○	○	n/a	n/a
Create COM servers	●	●	●	●	●
Setup toolkit	InstallShield	InstallShield (Not Standard edn)	InstallShield	Wizard	InstallShield
Component lib source	●	●	○	N/A	●
Profiler	● (Not Learning edition)	○	○	○	○
Scriptable IDE	●	○	○	○	○

Where several prices are shown, it refers to Learning, Standard, Developer and Enterprise editions. Enterprise generally has drivers for server databases and a few client licences.

Key: ● Yes ○ No



Good VIEWS

A flicker-free good-quality monitor is your passport to PC pleasure. Nik Rawlinson tests a team of 24.

The one component you need to perform well at all times is your display, so it's vital you choose the right one. Most PCs are sold with poor-quality 14in and 15in monitors, so it's not surprising to learn that decent 17in monitors are the most popular upgrade.

We've taken 24 17in monitors and tested them in our VNU Labs. Specifying no price restrictions, we chose 18 entry-level models with a maximum horizontal scanning frequency of around 65-70kHz, and six further high-end units with a horizontal scanning frequency of 85-95kHz for prospective buyers with a slightly more generous budget.

The entry-level monitors can display the popular 1,024 x 768 resolution at high, flicker-free refresh rates. The higher-end models can support this at higher rates, or reach 1,280 x 1,024 resolution.

We were also interested in the level of emissions from each monitor, whether they adhere to MPR-II and TCO conventions. Monitors emitting particularly strong magnetic or electrical fields can interfere with neighbouring screens, so in an office where several displays are used in close proximity, monitors that minimise such interference are particularly suitable.

We've looked at new technologies and made further suggestions for those who

want a different type of display altogether. Remember, you've only got one pair of eyes, so treat them well.

Monitors Contents

Entry-Level Monitors

- 200 ADI Microscan 5P
- 200 Belinea 10 70 15
- 200 CTX 1769SE
- 200 Eizo Flexscan F55
- 200 Hansol Mazellan 700A
- 200 Hitachi CM620ET
- 204 Iiyama MF-8617T Vision Master
- 204 LG Electronics 77i
- 204 Mitsubishi DiamondPro 67TXV
- 204 NEC A700
- 204 Nokia Multigraph 447ZA
- 204 Optiquest Q71
- 205 Panasonic PanaSync S70
- 205 Philips 107S
- 205 Samsung SyncMaster 700S
- 205 Sony Multiscan 200ES
- 205 Taxan ErgoVision 760
- 205 Viewsonic G773

High-End Monitors

- 208 Iiyama MT-90127T
- 208 Mitsubishi Diamond Pro 700
- 208 NEC P750
- 208 Samsung SyncMaster 700P
- 208 Sony Multiscan 200PS
- 208 Taxan EV750 TCO95

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- 209 Test Results
- 210 Choosing a display
- 210 Editor's Choice

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

Safety and emissions

We all spend hours in front of a computer screen without a thought for our safety. Consider the monitor, which consists of extremely high-voltage electron guns, firing streams of electrons sufficiently hard at a target of phosphors that they glow brightly enough to produce an image.

Those same guns are pointed *directly at your face*, typically for several hours a day, and are understandably of great concern.

Over the past few years, monitor manufacturers have conformed to a whole range of safety standards. First is the now ubiquitous Swedish MPR-II that was developed in 1990 to ensure that the magnetic and electric fields surrounding a display did not increase the ambient levels experienced in a work environment. As this standard was developed with the co-operation of monitor manufacturers, it did not push forward new developments; rather, it ensured that emissions were set at a level technologically attainable at the time.

MPR-II compliance also meant meeting the EN60950 international standard for electrical and fire safety. The development of the TCO 1992 guidelines meant that a compliant monitor would have to meet certain goals for radiation reduction and incorporate a facility to automatically cut the power should the unit be left idle for a specified length of time.

It was not until the implementation of the TCO 1995 standard that the requirements, which now also encompass the whole PC, took into consideration ergonomic qualities, energy efficiency and the ecological procedures implemented in the manufacture

of the monitor itself, as well as requirements pertaining to emissions that formed the bulk of TCO 92.

The next standard, TCO 99, is currently being drafted but several leading monitor companies feel it may go too far to be practical.

A common recommendation is that VDU users



The TCO logo shows that a monitor meets strict requirements on safety and recycling. TCO is currently drafting its TCO 99 specification

should sit at least 28ins from their screens because at this distance, harmful radiation emissions will have dropped off considerably. But apart from being impractical, this is often considered to be over-simplistic, too, since most radiation is emitted from the rear of a monitor and so it is often the monitor of a neighbouring user which has the potential to cause the most harm.

Power saving

A 17in CRT monitor typically consumes at least 100W of power. VESA's (Video Extended Standards Association) Display Power Management System (DPMS) allows a compliant video card and monitor to automatically power-down to conform to Energy Star-compliant levels, or those meeting the Swedish NUTEK requirements. The EPA's Energy Star regulations aim to encourage a system whereby monitors incorporate power-saving modes using less than 30W, while those conforming to the NUTEK guidelines and displaying a TCO 92 or 95 badge will power-down to a maximum of 30W, from which they should be able to recover within three seconds of a key press or mouse movement. After no longer than a further 70 minutes, they must reduce their power consumption to no more than 8W — except from this level, any recovery may take as long as activating the unit from cold.

Although software-based screensavers, like those bundled with Windows, marginally reduce power consumption, a typical monitor will still use 90W in this condition and do nothing to reduce the generated magnetic and electric fields. As monitors with a three-second suspend recovery time become more popular, we could see an end to the screensaver.

Current estimates are that using energy-saving measures to power monitors for eight hours a day can save a small- to medium-sized firm, with around 100 monitors, in excess of £6,000 over an average 12-month period. And there are savings made from the reduction in generated heat, so less air conditioning is needed.

The monitors in our test group demonstrated a wide variety of power-consumption rates. For example, the Belinia 10 70 15 at 95W was using 55W less than either the Diamond Pro 700 or the Optiquet Q71. While this may not make much of a difference on the basis of a single monitor, applying them to the example above, it is easy to see that they could lead to a potential increase in electricity costs of as much as 50 percent.

The standard Windows 95 Display Properties control panel supports screensavers and power saving. Note the adjustable standby and shut-off times



Monitor controls and USB



Above Some manufacturers are finally fitting USB ports to their monitors, but there are issues still to be resolved (see text)

Right Some graphics drivers add position and size controls to the standard Windows 95 display control panel. Note that the resolution of 1280 x 1024 at 85Hz results in a 91.1kHz signal

Controls

When you switch on your monitor, you may find that the image is not bright enough, not centred or has straight sides.

All monitors offer controls to correct or adjust a number of these complaints — some offer more than others. The controls themselves may be adjusted using buttons or via the software, with or without the aid of an on-screen display.

On-screen display (OSD) adjustment controls are becoming increasingly common. These are superimposed graphics which appear on the screen in a similar way to modern TV sets, superimposing, say, a bar when you're adjusting the volume. There are no OSD standards, so style, facilities and ease of use vary considerably.

In our test group, some monitors had their contrast and brightness controls separated from the OSD and implemented changes through the use of rotary controls on the front of the display. These were particularly easy to use and gave us immediate access to the two most commonly-used adjustments. Similarly, the Nokia Multigraph 447Za, with no less than 19 buttons on the fascia (enabling it to do without the OSD altogether), proved to be particularly flexible.

Setting up your monitor

VESA has inaugurated several standards for plug-and-play monitors. Known under the banner of DDC (Display



Data Channel) they should in theory allow your system to figure out and select the ideal settings, but in practice this very much depends on the combination of hardware in use. This standard is implemented in one of three levels: DDC1 and DDC2B, whereby the monitor communicates with the PC to present the user with a range of possible configuration options; and DDC2/AB (AB standing for ACCESS.bus) which is less common and allows the computer to control the monitor.

A number of ergonomic factors should be taken into consideration when setting up a monitor, such as its position on the desk and the user's working environment. If at all possible, monitors should be positioned so that the user is looking slightly downwards at the screen. This is often not possible if they are positioned on top of a PC case, so placing it directly on the desk is often thought to be a more suitable option.

To reduce screen flicker, a non-interlaced refresh rate of at least 72Hz (screen redraws per second) is recommended. Refresh rates, and the difference between interlaced and non-interlaced displays, is explained on page 198.

Universal Serial Bus, USB

Close to the user and with a ready supply of power, the monitor is surely the perfect place to position a USB port, although it is not yet as widespread as we would have liked. The ADI Microscan 5P is offering it as an optional extra built into the base of the unit, but the likes of CTX and Hitachi did not offer them with the models we reviewed here.

The monitor manufacturers are waiting for peripherals to become widespread and vice versa. This chicken-and-egg scenario may be cured by Windows 98 which features USB support as standard.

Manufacturers need to be careful how they incorporate USB ports into their monitors. USB ports require two channels, an input and an output, each of which uses 4W of power at any time. Because there is no allowance in the VESA command set to reactivate a USB port after it has been powered down, they need to remain active, constantly using 8W of power. However, to comply with various guidelines, monitors must be able to power down below this mark, thereby disabling the USB ports required to wake them up again.

Many manufacturers get around this problem by building USB into the base with a separate power supply, which is not technically required to meet the same guidelines as the monitor itself. This also gets around the problem of the high-speed USB bus interfering with the monitor's image. The high cost of shielding is also why you will tend to find USB ports fitted only to the rear of monitors.

How monitors work

A colour cathode ray tube (CRT) is like a huge glass bottle, with electron guns in its neck which fire at the screen in the bottom. The screen is covered with a matrix of dots, each consisting of three blobs of coloured phosphor: one red, one green, one blue. The three electron guns are aimed and fired at their respective blobs and each is illuminated to a greater or lesser extent.

The phosphors in a group are so close together that the human eye perceives the combination as a single, coloured, computer pixel. A metal mask separates each dot to minimise overspill where the electron beam would otherwise illuminate more than one dot.

Magnetic fields are applied to drag the electron beam to strike any point on the screen. The beam starts in the top left corner (as seen from the front), scans across to the right, then drops down a line and starts again at the left. This process is repeated until an entire screen is drawn, at which point the beam returns to the top to start again.

The number of times a complete screen is drawn per second is the refresh rate, measured in Hertz (Hz). The higher the refresh rate, the less flicker on the screen, up to a point where the brain perceives it as perfectly steady. A refresh rate above 70Hz is generally considered to be flicker-free.

Some monitors draw every other line (line numbers one, three and five, say) until the screen is full, then return to the top to fill in the even blanks (say lines two, four, six and so on). This process is known as interlacing and results in an unsteady image. Non-interlaced is where every line is drawn before returning to the top for the next frame, resulting in a far steadier display.

A computer's graphics circuitry creates a signal based on the Windows desktop resolution and refresh rate. This signal is known as the horizontal scanning frequency

(HSF) and is measured in kilohertz (kHz). When you raise the resolution and/or refresh rate, the HSF signal increases. A multi-scanning monitor, such as those tested here, is capable of locking on to any signal which lies between a minimum and maximum HSF. If the signal falls out of the monitor's range, it will not be displayed.

Typical modes of 1,024 x 768 and 1,280 x 1,024 resolution, both at non-interlaced 75Hz refresh rates, produce an HSF of around 60kHz and 80kHz respectively. The cheaper monitors we tested support a maximum HSF up to about 69kHz, while the more expensive models support a maximum

of between 85kHz and 95kHz, allowing higher resolutions and refresh rates.

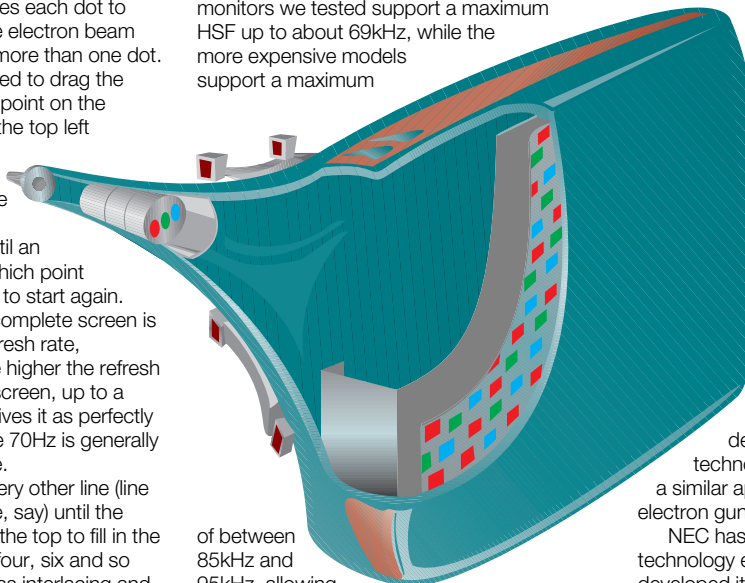
The maximum resolution of a monitor is dependent on more than just its highest scanning frequencies. It is also limited by the physical distance between adjacent groups of phosphors. This is known as the dot, grille or slot pitch, and is typically between 0.25 and 0.28mm. Since each phosphor group

represents the smallest pixel that the monitor is physically capable of resolving, trying to address anything finer will result in a blurred image, at best.

The vast majority of computer monitors use circular blobs of phosphor and arrange them in triangular formation. These groups are known as triads and the arrangement is a dot-trio design using a shadow mask, but there are alternatives.

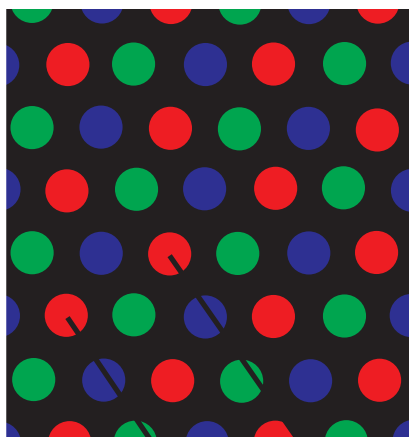
In the sixties, Sony developed a tube technology known as Trinitron where the coloured phosphors are laid down in uninterrupted vertical stripes. The mask separates entire stripes instead of each dot, and is known as an "aperture grille". Since less of the screen area is occupied by the mask, more of the phosphor can glow, resulting in a brighter and more vibrant display. The downside is that either one or two very fine wires must be run horizontally across the display to hold the aperture grille in place (they are just visible if you look closely). When Sony's copyright expired, Mitsubishi developed its own aperture-grille technology, called Diamondtron, using a similar aperture-grille mask but three electron guns instead of Sony's one.

NEC has recently taken the slotted-mask technology employed by most TV sets and developed it for higher-resolution computer displays. Known as ChromaClear, it employs elliptically-shaped phosphors grouped vertically and separated by a slotted mask. The slotted-mask design falls in-between aperture grille and dot trio shadow masks in terms of brightness and mechanical stability. It is a good compromise, but still quite a young technology for computer displays.

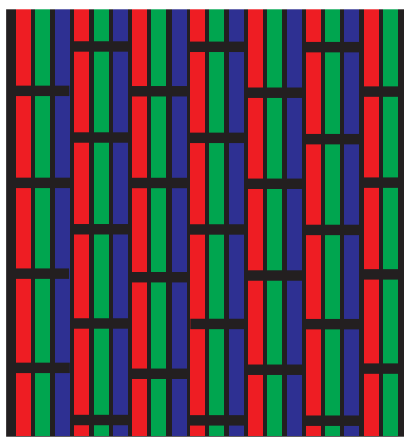


of between 85kHz and 95kHz, allowing higher resolutions and refresh rates.

The maximum resolution of a monitor is dependent on more than just its highest scanning frequencies. It is also limited by the physical distance between adjacent groups of phosphors. This is known as the dot, grille or slot pitch, and is typically between 0.25 and 0.28mm. Since each phosphor group



Dot trio



Slotted mask



Aperture Grille

A simplified close-up of three CRT phosphor and mask arrangements in common use today: (left to right) dot trio, slotted mask and aperture grille. It is clear which designs expose the most phosphor, resulting in a brighter display, although often at the risk of mechanical instability. The distance (shown in each diagram) between each like-coloured phosphor is the dot pitch.

ENTRY-LEVEL



ADI Microscan 5P

The cheapest monitor in our group test but at the cost of poor overall focus. Built-in microphone with the option to add matching speakers. Variable colour purity but no pre-set colour settings, moiré or convergence controls. Tiny control buttons. Includes three-year next-day replacement. Cheap and cheerful.

Belinea 10 70 15

A solid all-round model at an excellent price. Reasonably compact but with a generous 16in viewable diagonal. A fairly awkward OSD, slight focus loss and image ghosting marred an otherwise good performance. No moiré correction control so problems with some types of image. Worth considering.

CTX 1769SE

Average performance and price. Small 15.7in viewable diagonal; connection is via a captive D-SUB connector. Imperfect focus and loss of clarity makes Windows icons fuzzy. Brightness variations on white backgrounds compensated by good registration and regulation. Fair model, but beaten by others costing a similar amount.



Eizo Flexscan F55

A clean display but the highest price in this category. Choice of D-SUB or BNC connection with automatic recognition. Excellent focus, colour purity, regulation and screen geometry. OSD controlled by a single multi-function controller. Eizo once again demonstrates that great performance doesn't come cheap.

Hansol Mazellan 700A

Clear and easily navigable OSD using just three buttons. Fast access to rotary brightness and contrast controls separate from OSD. Slanted lines and slight rippling visible across high-contrast white displays. At 90W, the Hansol has one of the lowest consumptions. It's cheap, but beaten by others in a similar price bracket.

Hitachi CM620ET

Easily navigable but basic OSD. No options for parallelogram or convergence. Problems with brightness and uniformity. Lack of sharp focus. Good regulation and convergence results but slight linearity imperfections at the top. Good-sized 15.9in viewable diagonal with decent contrasts, but unremarkable overall.



Table of features

Manufacturer	ADI	Belinea	CTX	Eizo	Hansol	Hitachi
Model	Microscan 5P	10 70 15	1769SE	Flexscan F55	Mazellan 700A	CM620ET
Price (ex vat)	£259	£289	£349	£449	£285.11	£363
Price (inc vat)	£304.33	£339.58	£408	£527.58	£335	£426.53
Phone	0181 236 0801	0118 936 2900	01923 810800	01483 719500	01276 418213	0181 849 2092
URL	www.adi.com.tw	www.maxdata.co.uk	www.ctxintl.com	www.eizo.com	www.hansol-us.com	www.hitachi-eu.com/hel/bscd/
Visible diagonal	16in	16in	15.7in	15.6in	15.7in	15.9in
Tube type	Shadow mask	Shadow mask	Shadow mask	Shadow mask	Shadow mask	Shadow mask
Horizontal frequency	30 - 69kHz	30 - 70kHz	30 - 70kHz	27 - 70kHz	30 - 69kHz	31 - 69kHz
Max bandwidth	110MHz	108MHz	110MHz	115MHz	110MHz	N/A
Max 1024x768 refresh (NI)	85Hz	85Hz	85Hz	86Hz	85 Hz	85Hz
Dot / grille / slot pitch	.28mm	.27mm	.28mm	.28mm	.28mm	.28mm
TCO emissions?	○	TCO 95	TCO 95	TCO 95	TCO 95	TCO 95
Max consumption	115W	110W	120W	95W	90W	115W
Suspend consumption	15W	<4W	<15W	5W	<15W	N/A
USB port	Optional	○	○	○	○	○
Dimensions (whd; mm)	415 x 414 x 453	410 x 416 x 444	418 x 438 x 417	410 x 413 x 439	544 x 530 x 553	412 x 402 x 426

Key: ● Yes ○ No

ENTRY-LEVEL



Iiyama MF-8617T (Vision Master 17)

It could have been in our high-end section but its popularity and low price earn it an inclusion here. It uses an FST with a 15.8in viewable diagonal, and BNC and D-SUB connectors with automatic detection of video source. Not as attractive as some newer models but a sturdy, excellent performer. USB option, too.



LG Electronics 77i

This has a nice, positionable OSD in five languages controlled by a single button, but a confusingly back-to-front rotary control. Separate brightness and contrast controls. Captive D-SUB connection. Steady image at a variety of settings. Good contrast with minimal glare and reflection. Comparatively light at only 17kg.



Mitsubishi DiamondPro 67TXV

An excellent Diamondtron screen with a 16in viewable diagonal and an impressive, sharp, clear image. Controls were easy to use but the OSD is poorly laid out. Connection via captive D-SUB cable. Colour temperature is on a variable scale, but there are no presets. One of the more expensive models, but great picture.



NEC A700

Clean, sharp image boasting clearly-defined Windows icons and handling very small text admirably. 15.6in viewable diagonal. Captive D-SUB connection. The lowest power consumption of the bunch at 85W but relatively pricey. Includes a three-year limited parts and labour warranty.



Nokia Multigraph 447Za

Unlike the multifunction buttons of the rest, Nokia has fitted 19 front-mounted controls. Although initially bewildering, we found it easier to use than any of the other monitors in the test. Incorporates a pair of 5W speakers and directional microphone. Great image quality, which is sharp and clear with few problems.



Optiquest Q71

One of the cheapest monitors in this category but it has the highest power consumption at a hungry 150W. The Q71 suffers from uneven focus, linearity problems and poor regulation. Separate contrast and brightness controls on well laid-out OSD. 16in viewable diagonal. Suitable for budget upgraders.

Manufacturer	Iiyama	LG Electronics	Mitsubishi	NEC	Nokia	Optiquest
Model	MF-8617T	77i	Diamond Pro 67TXV	A700	Multigraph 447ZA	Q71
Price (ex vat)	£389	£335	£395	£379	£375	£269
Price (inc vat)	£457.08	£393.63	£464.13	£460	£440.63	£316.08
Phone	01438 745482	01753 500426	01707 276100	0181 993 8111	01793 512809	0800 833648
URL	www.iiyama.co.uk	www.lge.co.kr	www.meuk.mee.com/display	www.euronec.com	www.nokia.com	www.optiquest.com
Visible diagonal	15.8in	15.8in	16in	15.6in	15.6in	16in
Tube type	Shadow mask	Shadow mask	Diamondtron	Shadow mask	Shadow mask	Shadow mask
Horizontal frequency	27 - 86kHz	30 - 70kHz	30 - 69kHz	31 - 69kHz	31 - 72kHz	30 - 70kHz
Max bandwidth	160MHz	110MHz	100MHz	N/A	100MHz	135MHz
Max 1024x768 refresh (Hz)	100Hz	85Hz	85Hz	85Hz	90Hz	87Hz
Dot / grille / slot pitch	.26mm	.28mm	.25mm	.28mm	.27mm	.28mm
TCO emissions?	TCO 95	○	TCO 92	○	TCO 95	○
Max consumption	130W	120W	115W	85W	100W	150W
Suspend consumption	8W	<15W	15W	<8W	<30W	<30
USB port	optional	○	○	○	coming soon	○
Dimensions (whd; mm)	412 x 422 x 415	412 x 428 x 431	410 x 409 x 425	403 x 427 x 440	422 x 429 x 427	411 x 424 x 462

Key: ● Yes ○ No

ENTRY-LEVEL

**Panasonic PanaSync S70**

16in viewable diagonal. Connection via 1.5m captive D-SUB cable. Repositionable and extensive OSD in five languages incorporating self-test mode, four colour presets and one user-definable setting. One of the lowest maximum power consumptions at 95W.

**Philips 107S**

Generally good focus and picture quality but streaking and moiré diffraction is evident. 15.9in viewable diagonal framed by large bezel. OSD easily navigated using rotating wheel. Two further wheels control brightness and contrast. Particularly fine 0.24mm dot pitch. Competitive.

**Samsung SyncMaster 700S**

Excellent OSD supplemented by rotary controls for brightness and contrast. Slight ghosting and a loss of brightness due to low 80MHz bandwidth. Average sharpness. 15.7in viewable tube. No TCO certification. Beaten in performance and price by other models.

**Sony Multiscan 200ES**

Excellent picture quality compensates for a basic feature set and limited number of image correction controls. The 16in Trinitron screen boasts constant focus, steady colour purity and brightness levels across the display. Above-average performance at a reasonable price.

**Taxan ErgoVision 760 TCO95**

Small 15.5in viewable diagonal. However, it has easily the shortest tube on test (392mm) and one of the best OSDs in this review, using a single rotary control to navigate. No option to change colour settings or remove moiré. Good geometry with no distortion. Solid contender.

**Viewsonic G773**

Clean, sharp display. Excellent OSD based around a single linear menu using words and pictures and four-menu language choices. No separate set-front contrast and brightness controls. 16in viewable diagonal. 48-hour Express Exchange warranty. Good, but pricey.

Table of features

Manufacturer	Panasonic	Philips	Samsung	Sony	Taxan	Viewsonic
Model	Panasync S70	107S	SM700S	CPD-200ES	EV760TCO95	G773
Price (ex vat)	£368	£319	£328	£359	£349	£399
Price (inc vat)	£432.40	£374.83	£385.40	£421.83	£410.08	£468.83
Phone	0500 404041	0181 689 4444	0181 391 0168	0990 424424	01344 484646	0800 833648
URL	www.panasonic.com	www.philips.com	www.samsung.com	www.sony-cp.com	www.taxan.co.uk	www.viewsonic.com
Visible diagonal	16in	15.9in	15.7in	16in	15.5in	16in
Tube type	Shadow mask	Shadow mask	Shadow Mask	Trinitron	Shadow mask	Shadow Mask
Horizontal frequency	30 - 70kHz	30 - 69kHz	30 - 69kHz	30 - 70kHz	30 - 70kHz	30 - 70kHz
Max bandwidth	108MHz	110MHz	80MHz	N/A	100MHz	110MHz
Max 1024x768 refresh (NI)	86Hz	85Hz	85Hz	85Hz	86Hz	87Hz
Dot / grille / slot pitch	.27mm	.24mm	.28mm	.25mm	.27mm	.26mm
TCO emissions?	TCO 92	(to be advised)	○	TCO 92	TCO 95	TCO 95
Max consumption	95W	110W	100W	120W	105W	110W
Suspend consumption	4W	<15W	<15W	<15W	<15W	N/A
USB port	○	○	○	○	○	○
Dimensions (whd; mm)	410 x 416 x 444	420 x 424 x 452	424 x 423 x 444	406 x 432 x 420	408 x 420 x 392	432 x 426 x 439

Key: ● Yes ○ No

HIGH-END



Iiyama MT-9017T (Vision Master Pro 17)

One of the highest specifications at a low price, the popular VisionMaster Pro boasts clean, sharp and vibrant images from its 16in DiamondTron tube. The OSD can be tricky to navigate with only three buttons and power consumption relatively high at 130W, but for the price you can't argue with its picture.



Mitsubishi Diamond Pro 700

This highest-specced DiamondTron tube could easily display flicker-free images up to an impressive 1,600 x 1,200 and still retain a well-focused image with only slight moiré. BNC and D-SUB ports but no auto detection of input source. Extensive OSD with colour purity settings. Great monitor, but Iiyama is cheaper.



NEC MultiSync P750

Excellent OSD spread across six graphical screens utilising easy six-button control. D-SUB and BNC connection. Sharp image, with minimal glare and reflection from NEC's own ChromaClear tube. It's a high-spec monitor which performs well, but NEC's ChromaClear nevertheless carries a high price.



Samsung SyncMaster 700P

The only monitor out of these six high-end models to use a conventional shadow mask tube but offering excellent image clarity and sharp focus nonetheless. Connection via BNC and D-SUB but no auto detect of video source. 15.7in viewable diagonal. OSD navigated with single four-way cursor button. Fair value and good performance, but beaten on price.



Sony Multiscan 200PS

With the only Trinitron tube of our high-end half-dozen, the Multiscan managed to carry the highest price tag, too. Auto-detecting D-SUB and BNC connectors, an excellent manual, Mac adapter, and Inf settings supplied on a floppy. Zoom function allows horizontal and vertical sizes to be adjusted simultaneously. Slight convergence problems. Let down by price.



Taxan ErgoVision EV750 TCO95

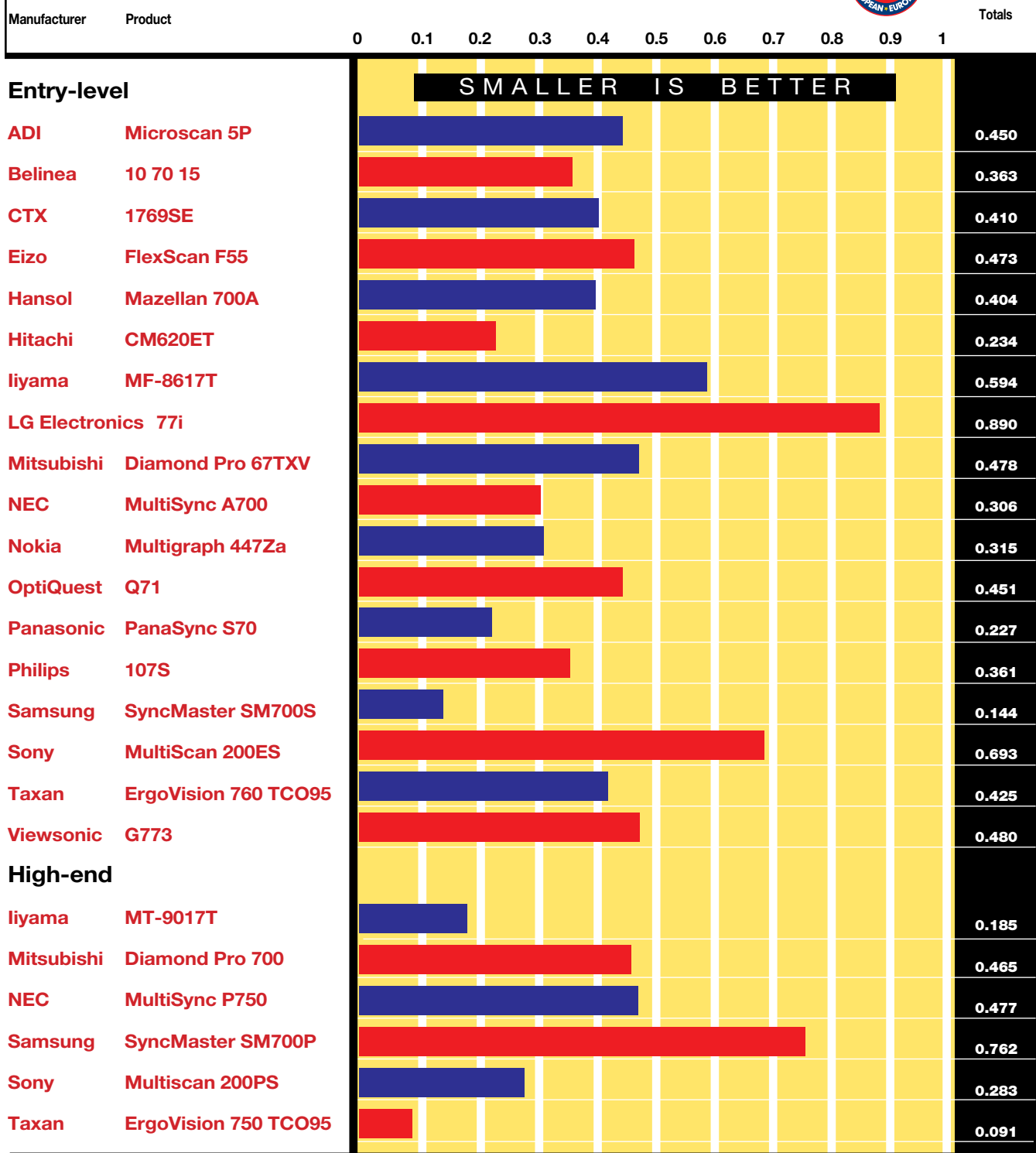
Another bright, clean and vibrant DiamondTron tube but with a slightly lower scanning range than that of the Iiyamas and Mitsubishis. D-SUB and BNC connectors, an extensive OSD, and a low claimed consumption of 101W. It represents good value for money and would have been a contender had it not been for the higher-performing (slightly cheaper) Iiyama.

Table of features		Personal Computer World Highly Commended	Personal Computer World Editor's Choice		Personal Computer World Highly Commended	
Manufacturer	Iiyama	Mitsubishi	NEC	Samsung	Sony	Taxan
Model	MT-9017T	Diamond Pro 700	P750	SM700P	GDM-200PS	EV750TCO95
Price (ex vat)	£409	£485	£589	£453	£595	£449
Price (inc vat)	£480.58	£569.88	£692.08	£532.28	£699.13	£527.58
Phone	01438 745482	01707 276100	0181 993 8111	0181 391 0168	0990 424424	01344 484646
URL	www.iiyama.co.uk	www.meuk.mee.com/display	www.euronec.com	www.samsung.com	www.sony-cp.com	www.taxan.co.uk
Visible diagonal	15.98in	16in	15.6in	15.7in	16in	16in
Tube type	DiamondTron	DiamondTron	ChromaClear	Shadow Mask	Trinitron	Diamondtron
Horizontal frequency	27 - 92kHz	30 - 95kHz	31 - 94kHz	30 - 85kHz	30 - 92kHz	30 - 86kHz
Max bandwidth	160MHz	150MHz	N/A	135MHz	N/A	135MHz
Max 1024x768 refresh (NI)	100Hz	115Hz	75 kHz	85Hz	114Hz	107Hz
Dot / grille / slot pitch	.25mm	.25mm	.25mm slot mask	.26mm	.25mm	.25mm
TCO emissions?	TCO 95	TCO 95	TCO 95	TCO 95	TCO 95	TCO 95
Max consumption	130W	130W	125W	120W	130W	101W
Suspend consumption	8W	15W	N/A	<15W	<15W	<15W
USB port	Optional	Optional	○	○	○	○
Dimensions (whd; mm)	412 x 422 x 420	410 x 409 x 425	403 x 430 x 449	424 x 423 x 444	406 x 432 x 420	410 x 409 x 433

Key: ● Yes ○ No



Overall white error margin



How we did the tests

The performance of a monitor can be affected by a number of factors like ambient temperature, orientation and interference from closely-located electrical equipment. Our tests were set up to minimise these effects and the room temperature was kept at 18°C. The monitors were positioned where other equipment could not interfere, and each was left to warm up for an hour and was degaussed immediately prior to the testing process. Measurements were made using a Minolta CA-100 colour analyser that records values for luminance and colour purity. This also was left to warm up for an

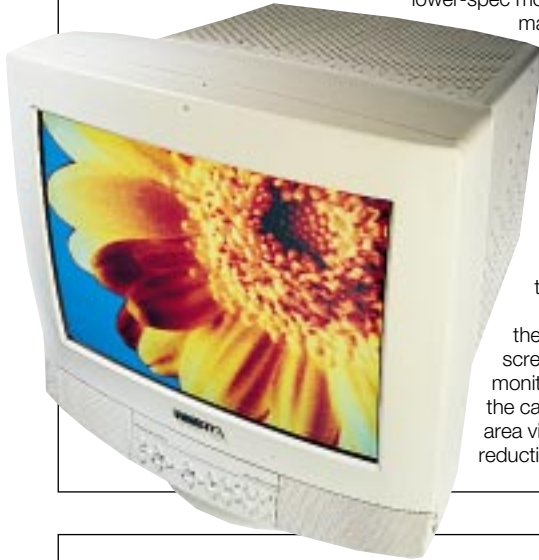
hour prior to use and was recalibrated before testing each monitor. The colour analyser records luminance (measured in candelas per m²), and x and y colour co-ordinates as plotted on the internationally-recognised CIE (1976) chromaticity diagram. With the brightness and contrast of each monitor set to maximum, an initial luminance measurement was made at the centre of an all-white screen to record maximum brightness levels. The centre luminance was then reduced to 50 candelas per m² for the remaining measurements. Actual brightness and purity levels are not important (most monitors will let you change both these settings) but the variations

across the screen are important in determining a monitor's quality. To measure this, we took readings at the centre and at each of the four corners of the all-white screen. The process was repeated using red, green and blue screens. Results for luminance and the four colour purities are displayed as an average difference between the centre value and the four corner values. The overall white error margin for each monitor, taking into account results for red, green and blue error margins, is shown above — smaller is better. Note that this does not take focus or convergence into account, which was judged subjectively by an expert panel.



Editor's Choice

Having examined such a wide selection of monitors, there are a number of factors that must be considered in deciding which should be awarded our Editor's Choice. The maximum resolution is an important consideration. However, as we tested both high-end and lower-spec models it would be unfair to make an award purely on that basis.



Price is also a consideration. As technology develops year by year, prices fall rapidly: some real bargains are available for between £300 and £350, with one monitor in this review clocking in at less than that.

A further consideration is the viewable area of the screen. Although these monitors are stated to be 17in, the casing will always reduce the area visible to the user. This reduction was as great as 1.5in,

taking the screen area down to 15.5in in the case of some of the monitors we tested. While the difference between this and 16in may not seem great, the difference it makes to the end-user is surprisingly evident.

Concerning the higher-end range of monitors, we were particularly impressed by the **Mitsubishi DiamondPro 700** which earns it our **Editor's Choice**. It has a crisp image and well-adjusted colours, and attaining a flicker-free resolution of 1,600 x 1,200 makes it particularly suitable for budget design work or for design applications where there is no room for a 21in or larger monitor.

The **Iiyama Vision Master Pro 17**, with its supreme clarity and rich, vibrant colours, has more than proved its worth over time, and the **Taxan Ergovision 750** which demonstrated a high level of focus, are both **Highly Commended**.

At the lower end of the range tested, the **Nokia 4472a** with its easy-to-use controls and integrated 5W speakers is awarded our **Editor's Choice**. Its 19 front-mounted buttons gave instant access to a wide range of controls in a much more convenient way than even the most intuitive OSD.

Both the **Belinea 10 70 15** and the **Iiyama VisionMaster 17** are justly awarded a **Highly Commended** accolade for their value-for-money/performance ratios. At under £400 the Iiyama demonstrates exceptional performance in its class. ■

Choosing a display

The reviews in this group test concentrate entirely on 17in CRT monitors, which make up the bulk of monitor upgrade sales. But there are many other types of displays and technologies which may better suit your needs.

- Most obviously, there are different sizes of CRT monitors, typically ranging from 14in to 21in. It is important to remember that these sizes refer to the internal tube dimensions and not what you can actually see and use on-screen, which is always about ten percent less. An average 17in monitor may only have a viewable diagonal of 15.5in. We have measured the viewable diagonal of all the monitors and quoted them in our tables of features. Interestingly, due to legal action, most monitor manufacturers have renamed their products to avoid the numbers 14, 15, 17, 20 and 21.

As graphical user interfaces such as Windows have become increasingly dominant, users have realised the benefits of using higher display resolutions. You simply fit more on the screen, which not only increases productivity but is also a much more pleasant way to work. But the higher the resolution,

the smaller the details, hence the need for a physically larger screen.

Typically, a resolution of 800 x 600 pixels is ideal for a 15in monitor, while a 17in can better handle 1,024 x 768, leaving really high resolutions of 1,280 x 1,024 and above to 19, 20 and 21in monitors.

The VGA 14in monitor has finally been topped from its number one sales spot by 15in models, while 17in monitors are becoming increasingly popular. High-end graphics, design, pre-press and CAD users frequently go one step further to 20in or 21in displays, where A4 and sometimes even A3 documents can be displayed life-size. Some companies have developed rotating 17in monitors which allow you to display an A4 portrait document life-size without the cost or size of a 21in model. We've even seen the occasional widescreen monitor.

- A new entry in the past year is the 19in monitor, offering a significantly larger image than a 17in but at a much lower cost than a 20in or 21in model. Hitachi was first with a 19in tube, currently used in several manufacturers' monitors. Sony has just recently released a 19in monitor and indeed its first 21in monitor, both employing the company's Trinitron tube technology. Interestingly, these do not replace the company's popular 20in model which remains in a range clearly offering something for everyone.

A 21in monitor may seem large to a single user, but if you're making a presentation to several or even hundreds of people, you're going to want something bigger. Beyond 37in CRTs you enter the realm of projection systems.

- A video projector works very much like a film projector: you darken a room and project a large image onto a distant screen. Video projectors allow you to do this using computer or video signals and are perfect for the huge presentation or home cinema experience. When considering a projector, bear in mind that ideally even the brightest models require darkened rooms.

- If space is at a premium, a flat LCD panel display could be the answer. A 15in 1,024 x 768 panel display shows an image similar in size to that of a 17in CRT but currently costs around four to five times the price. On the plus side, they're only an inch or so thick, consume much less power and emit far fewer emissions. These size, weight and low-power advantages have made panels a big hit in scientific, space and military applications and they're also popular with those for whom looks or size are paramount. City trading rooms can easily absorb the cost of panel displays, whose small size allow more information to be presented in the same offices; their low power consumption could result in lower air conditioning bills, too.

Gordon Laing

For the space-conscious user, flat-panel displays could be the ideal replacement for their bulky cousins



Evol ways

Toby Howard considers the evolution of evolware. By utilising the laws of natural selection, self-repairing and self-reproducing computers may soon become a reality.

In the fifties, John von Neumann conceived the idea of machines which could automatically repair themselves and even reproduce. It was an idea straight from the pages of science fiction and has stimulated decades of research into cybernetics and artificial life. Now, some of Neumann's ideas are becoming reality, as engineers begin to create a new species of computer hardware; not by painstaking design, but by evolving it using the laws of natural selection.

Adrian Thompson, a researcher at the University of Sussex, recently created one of the first working examples of evolved electronics, or "evolware", using a special chip



called a Field Programmable Gate Array (FPGA), a kind of logical Lego set. The chip comprises a 64 x 64 grid of simple logic cells, each of which can perform one of the basic Boolean operations such as AND, OR and NOT.

The operation performed by each cell and how its inputs and outputs connect with other cells, is determined by a string of bits stored in the chip's master memory. This makes the chip incredibly flexible: one particular bit string might configure the chip to perform as an adder, another might make it a multiplier, and so on. This bit string is a single sentence of information which completely describes the chip's function. And a new string can be downloaded onto the chip from a host PC at any time. When it arrives, the chip reconfigures itself immediately.

Thompson's experiment involved using only a 10 x 10 corner of the entire grid of logic cells and he set out to evolve a circuit which would be able to tell the difference between two audio tones applied to its input (see www.cogs.susx.ac.uk/users/adrianth/ade.html). Many experts considered it impossible to configure 100 simple binary logic elements to do this job, without giving them access to a clock pulse for providing a timing reference. Thompson proved them wrong and, not only that, the circuit designed itself.

Thompson used a "Genetic Algorithm", an extremely simplified model of how biological evolution occurs. The idea is to create a population of individuals, each of which has its own genetic identity, called its "genotype". In terms of the FPGA chip, the genotype is the bit-string which encodes the chip's configuration.

The evolutionary process begins by generating an initial population of individuals, each with a random genotype. Then, the "fitness" of each individual is evaluated by creating the corresponding circuit (by downloading the genotype onto the chip) and checking

to see how well the circuit performs. Naturally, at this early stage it is exceedingly unlikely that a randomly-created genotype will correspond to a usefully working circuit. But some of the initial circuits will at least do something, even if it is quite unrelated to the desired result, and some will be better than others.

Having tested all the genotypes of the first generation, the next step is to breed a new one. The fittest individual is retained and, of the remaining population, a few fit specimens are selected to be "parents". Their genetic material — the bits in their genotypes — are then combined to create the "children" which will populate the new generation. At this stage, a small number of random mutations are also allowed to occur. The process then repeats — what might take millions of years in nature, occurs in just a few seconds.

In effect, the algorithm is searching through all the possible configurations of the circuit but ignoring vast numbers of configurations which are unlikely to be successful.

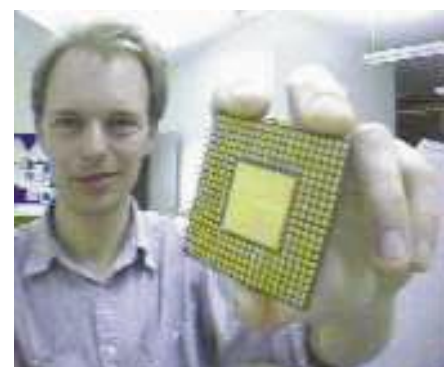
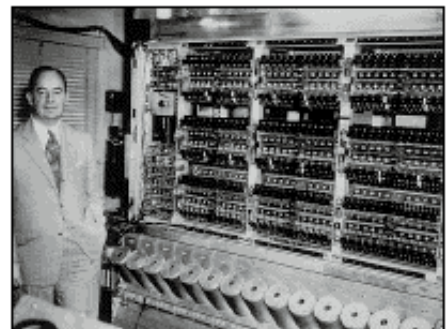
In Thompson's experiment, the size of the first random population was 50 and each genotype was a string of 1,800 bits. The Genetic Algorithm ran on a PC, transferring new genotypes onto the chip as they were generated.

Thompson monitored the circuit's behaviour with an oscilloscope, watching the waveforms change as the circuit evolved.

Initially the circuit produced only a constant output, but after a few hundred generations it began to copy its input to its output. After 650 generations it could partially detect one audio tone but not the other. By

generation 1,400, the behaviour became more stable and the circuit began to discriminate between the two tones. After 5,000 generations, the circuit worked.

But it was a strange circuit. It had ceased to be entirely digital, as the underlying analogue nature of the microscopic transistors became apparent. This is something which a digital designer, happy only to shuffle clean 0s and 1s, would never contemplate. Thompson saw "very strange-looking waveforms" on his



Inset & above (top) John von Neumann
Above Adrian Thompson holding the Field Programmable Gate Array chip

oscilloscope, wobbly patterns far removed from the flat edges of on-off digital signals. "They would seem utterly absurd to a digital designer," he said. And yet this weird circuit, which according to conventional digital theory was misbehaving wildly, actually worked.

Evolware is becoming a major international research topic: Thompson is now evolving more complex circuits, including one which successfully controls the wanderings of a small robot. At the Swiss Federal Institute of Technology, researchers have created a computer they call The Firefly <<http://www.epfl.ch/~moshes/>>, made

partially from evolware. And a group at the Electrotechnical Laboratory in Japan is studying evolware which changes its function in real time <<http://www.etl.go.jp/eti/kikou/ehw.html>>.

Will this put hardware designers out of a job? Will all hardware become evolware? It's unlikely. Many evolved designs, while working correctly, turn out to be complex and inefficient. But evolware promises to show us circuits we've never dreamt possible. The self-repairing, self-reproducing machines of von Neumann are on the horizon. ■

It's a gas

A huge, flat, wall-mounted display for your PC monitor, or for watching TV? It would cost a packet... or would it? Lynley Oram looks to the future of gas plasma displays.

The invention of the Cathode Ray Tube (CRT) has, in many ways, defined the late 20th century. Over the years there have been refinements, but the newest widescreen TV still works on the same principles as the first monochrome

models. The trouble with CRTs is that they are big and heavy and take up lots of space. Flat-panel displays are the future, and the sooner that future arrives, the better. The LCD (Liquid Crystal Display) type of flat-panel display (as used in notebooks) has been around for a while.

The hottest type of flat panel, and the technology which is exciting the major manufacturers, is Gas Plasma, also known as Plasma Display Panels (PDP). Products using gas plasma have been trickling onto the market since 1996, although the technology itself was first developed in the sixties.

The problem to date has been the cost of these products. A 40in screen that you can hang on the wall and use for presentations or watching TV, is a great idea. Unfortunately, such flexibility currently sets you back close to £10,000, not the sort of money most of us are willing to fork out for a TV or a computer display.

Fujitsu, NEC and Hitachi are confident that the prices of PDPs will fall dramatically over the next few years as demand increases, and they are busy developing products accordingly. Fujitsu in particular is adamant that plasma displays will eventually replace CRTs for larger-sized applications, where screens sized from 30 inches to 100 inches are required. These include airports, presentation suites and home theatres.

A plasma display consists of two parallel glass panels, 100 to 200 microns apart, on which electrodes covered with a dielectric glass layer have been etched. Between

these two plates, three tiny pockets of rare gases are trapped, kept apart at the sides by ribs. Voltage applied between the electrodes results in an internal voltage difference and ultraviolet radiation occurs. This activates the coated phosphor dots at the bottom of each cell and visible light is emitted. A colour image is achieved by controlling the luminance of the individual red, blue and green phosphors. the same principle as fluorescent light.

This gives PDP a natural advantage over LCD, as it uses a simpler technology which makes it easier to manufacture. Also, LCD panels suffer from limitations such as a narrow viewing angle and the requirement for backlighting. But PDPs have their drawbacks, too, weighing more than LCDs and requiring more power.

Far from competing, though, the two types of flat panels actually complement each other. LCD is straining at the edge of its ability once you push the screen size above 20 inches (measured diagonally), whereas it is not yet possible to build a plasma display below 20 inches. This is due to the physical constraints of the cell structure which makes up each pixel. Because you have to keep the cell size the same, doubling the screen resolution also doubles the size of the screen, although the size of the cell structure has already been reduced by some companies.

The extreme flexibility of these hang-on-the-wall plasma displays will attract a lot of corporate buyers. Over the next two years it is likely that PDPs will replace all those banks of monitors we see in large music stores, for instance. A PDP can be viewed from any angle, is not affected by temperature changes or magnetic fields, is about one tenth of the thickness of a CRT and about one sixth of the weight. Best of all, whenever you feel like a change, simply hang it on a different wall.

Most firms are saying that PDP pricing will be comparable to equivalent-sized CRT displays. For the time being, though, computer users are stuck with CRT due to PDP size limitation. But in a few years time, with the decreasing cost of PDP technology and the introduction of digital TV, there will be few homes in the UK without flat-screen TV. ■



Hang-on-the-wall plasma displays are set to replace CRTs as the display for larger-sized applications

Hands On Contents

■ *Hands On* is the place where readers can contribute to *PCW* and, as always, we'll pay for anything we use. Macros, sections of code, and hints and tips will be rewarded with a £20 book or record token (please say which you would prefer) and we will pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format. All submissions should be emailed to the author of the appropriate column or snailmailed to Hands On, Personal Computer World Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313. We are constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to pcw@vnu.co.uk.

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PCW/Hands On on CD-ROM

Tip, trick, advice or review — if you saw it here first, you can find it again: there's a year's worth of *Hands On* columns on our monthly CD-ROM. For problem-solving or that elusive handy hint, our the *PCW* cover CD has the answer.



Servers with a smile

In his new five-part series, Mark Whitehorn guides you through turning a single-user database into a client-server version. Part 1 deals with choosing the right tools for the job.

In my regular *Hands On Databases* column in *PCW*, I have been dealing with the theory behind client-server databases and how standalone databases can be upgraded to server-based applications.

In this workshop series over the next few months I'm going to cover some of the practical aspects of this work. But this immediately poses a problem: practical work means I have to come off the fence and start using specific products, namely

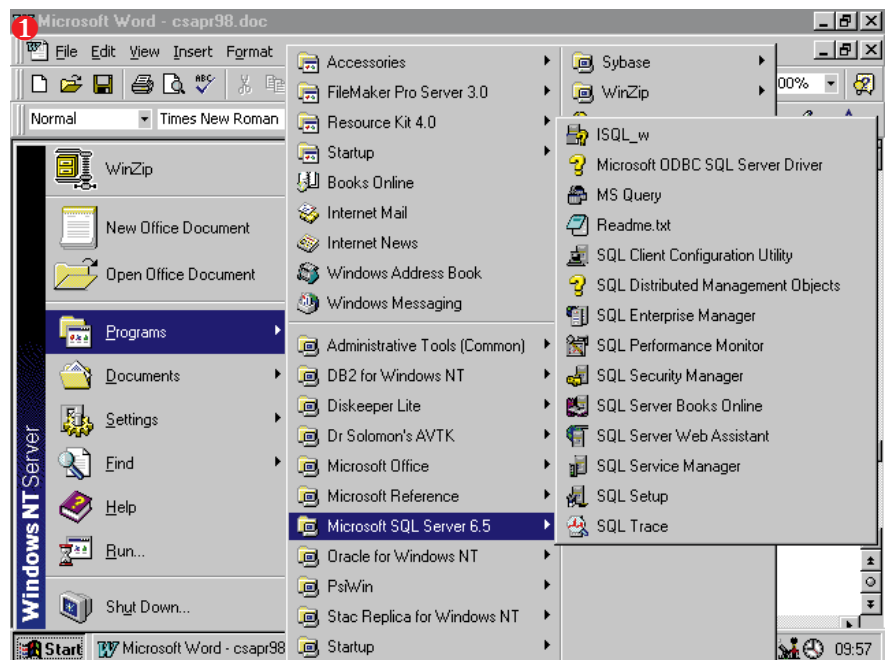
- a client-based RDBMS;
- an OS for the server; and
- an RDBMS for the server.

Choosing the products

Choosing the client-based RDBMS is relatively easy: not only does Access dominate the market, but I happen to think it's the best tool around.

In similar fashion, the choice of OS for the server is easy. Unix is very powerful, OS/2 is technically highly competent. But none of this matters because almost everyone is going to use NT; so that is what I'll use for this workshop.

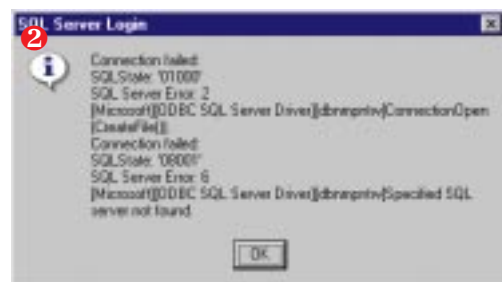
Rather more crucial (not to say controversial) is the server-based RDBMS. Despite what any manufacturer tries to tell you, no particular product can realistically claim to dominate the market. True, Microsoft's SQL Server currently outships the opposition, but the predicted growth in the database server market makes this statistic relatively meaningless: ninety percent of ten percent (or whatever the figures happen to be this week) is still only nine percent. In addition, I happen to have a penchant for IBM's DB2 for NT, finding it wonderfully stable, powerful, cost-effective and fun to drive. As the final nail in the



coffin, I have already gone on record as having doubts about SQL Server's scalability. Bearing this in mind, my choice of back-end server for this workshop has to be SQL Server.

OK, it may sound weird, but look at it from my angle: if I go on about DB2 much more (I've just published a book on it) everyone will believe I am in the pay of IBM! SQL Server does sell well and the concerns about scalability relate to big databases with many users. This series is aimed at scaling up an Access database. Few of these are likely to move abruptly from one user to 1,000, so the scalability issue is unlikely to be a big problem. Despite any misgivings, I actually quite like SQL Server.

Now that all the products I have chosen come from Microsoft (Access, NT and SQL



Server) people will say that I am in the pay, not of Big Blue, but of Big Bill... (Sigh!).

What do you have up and running?

Anyway, enough about me and my paranoia; what about you? I am going to assume that you have Access installed on a client machine and that somewhere you have an NT server which is patched up to and including service pack 3 (or higher if a new one is out by the time this is published).



SQL Server is "sensitive" to NT patch levels below that level, which means the install will fail if service pack 3 hasn't been installed. You have been warned.

On your marks... Installation

SQL Server arrives on CD-ROM, complete with paper manuals. These manuals are a great point in favour of SQL Server (most server-based RDBMSs come only with electronic manuals). I like paper-based manuals, because they can be read at leisure; in the bath, say, with no fear of electrocution.

The bad news is that the most recent version of SQL Server is 6.5 but the manuals are specifically for 6.0. Instead of reprinting the lot, Microsoft has added a manual called *What's New in SQL Server 6.5*.

It is well worth reading the agreeably slim setup manual before installing the product. It tells you all the stuff that I am likely to gloss over, such as the directory structure which will be created, and so on. There seems little point in detailing it all when Microsoft has already done so. One point worth mentioning is that the manual tells you that the server needs a minimum of 16Mb of RAM.

Now, assuming that you have a life and don't relish spending all of it sitting in front of a server listening to the disk thrash, go for a minimum of 64Mb and work up from there. I ran it on a trusty Compaq 5000 ProLiant with 384Mb of RAM. Overkill? Perhaps. But SQL Server certainly flies on the Compaq.

The install procedure is relatively straightforward and most of the choices you are required to make will depend on the network you're using. Apart from suggesting that you elect for manual startup and that you do install the electronic versions of the

manuals (they only take up 15Mb, I'll leave you to it).

Oh, just one more point: SQL Server itself also has service packs. These are available on TechNet and also on the web from backoffice.microsoft.com/downtrial/moreinfo/sqlsp.asp.

Considering that SQL Server is so picky about NT's patches, it would seem wise to install its own as well. Once installation is complete, you should find a set of programs at your disposal (Fig 1). With so much to choose from, where do you start? SQL Service Manager is the answer.

Pause for breath

Where do we go from here? During this series I intend to deal with how you can upgrade an Access database to one running under SQL Server on NT.

I have assumed that you have some familiarity with all three products, but realistically for most people, SQL Server is likely to be the one with which they are least familiar. Bearing this in mind, I thought I would spend at least the first instalment of this series providing you with a brief introduction to SQL Server, and I will try to give an overview of the tools you are most likely to find useful.

SQL Service Manager

SQL Server runs as an NT service and, assuming that you opted for manual start during installation, it will currently be stopped. This is boring because it means that everything you try to do with SQL Server will fail, with odd and bizarre error messages. For instance, Fig 2 shows one that I got from MS Query by trying to use it without starting SQL Server.

You can start the SQL Server service in the normal way (Start button, Settings, Control Panel,

Services etc) but why bother when you can use SQL Service Manager (Fig 3)? Not only does this let you home in on the service you need, MSSQLServer, but it also gives you a set of lights with which to control it. If you double-click on the Start/Continue label, the service should start.

SQL Enterprise Manager

Next on the most useful list, and the tool you are going to be using most, is SQL Enterprise Manager. Find this and fire it up. SQL Enterprise Manager is a very powerful tool and with it you can perform a whole host of operations, including:

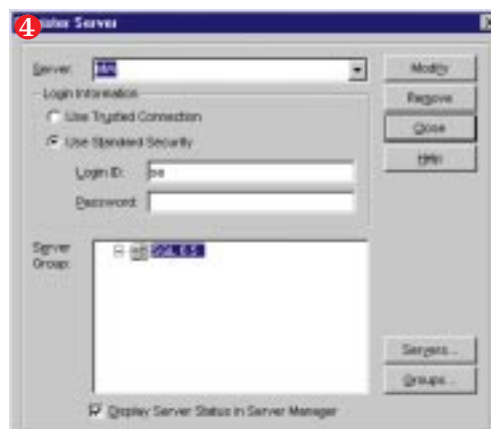
- Manage backups
- Execute queries
- Analyse queries
- Manage logins and database users
- Monitor server activity

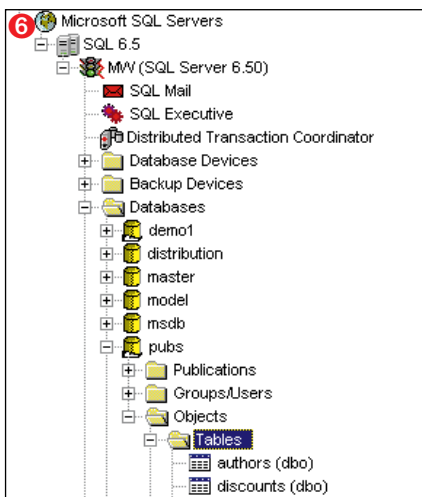
More than this, as the name suggests, Enterprise Manager (EM) allows you to manage more than one database server, including those on other machines within your enterprise.

So, when you first fire it up, it needs to know which database server you are intending to manage and will open the dialog box shown in Fig 4.

Assuming that you are just starting up, you will probably have a limited choice here; probably just the server and Login ID you used during the install of SQL Server. My server is called MW and I am using an SQL ID called SA (for System Administrator).

Once you have registered the server, EM should thereafter fire up without stopping to ask. But you can register more servers at any time by choosing Server, Register Server from the menu system. ➤





You should find that your server appears in EM as an icon which now looks hauntingly familiar (it's those traffic lights again). You can right-click on the icon and start and stop the server without recourse to SQL Service Manager. In common with many Windows programs, SQL Server often provides several ways of achieving the same end result.

You can right-click on an object within EM to get a list of its properties/options. For example, if you right-click on a server, you can select Configure and alter the configuration parameters for that server (Fig 5). These parameters make a frightening list, particularly given the way the information is expressed. For example, the value given for the first parameter, affinity mask, is treated as a bit mask so the value 19 is interpreted as binary 0001,0011. In turn, this indicates that processors 1, 2 and 5 may be used... So this is a user-friendly GUI, is it?

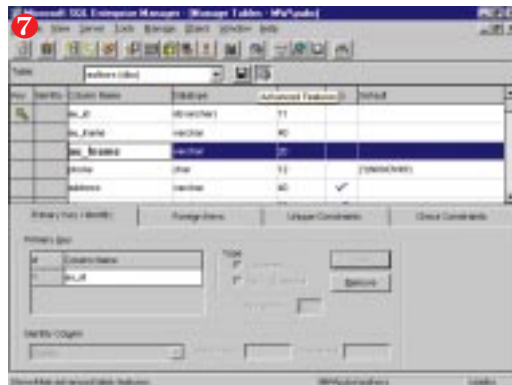
The good news is that you can leave most of these parameters alone, at least for the moment. Only one is worth altering on most servers and that is Memory which, by default, is set far too low. SQL Server allocates itself memory in 2K blocks, so the default maximum that it can take from NT is $8192 * 2K = 16Mb$.

In stark contrast, the Microsoft web site contains a document that recommends starting with about half your system memory dedicated to SQL Server. It then suggests you re-run your database app and record the changes you observe in terms of speed. You are advised to adjust the memory option upward (iteratively) until no additional performance gains are seen.

Remembering that the Compaq has 384Mb, the default of 16Mb seems a bit mean. Given a server with 64Mb, you might like to reset the memory current setting to 16384. For the change to take effect you have to stop and restart the server, but that is a matter of using the traffic lights.

Incidentally, a quirk of SQL Server is that if you stop the server and then immediately restart, it will generate an error message. This seems to be simply because it reports the service as being stopped before it has really finished. Waiting about ten seconds before restarting avoids this problem.

If you expand the server in the EM window (by clicking on the + symbol next to the traffic lights) you can see the objects it



contains. For example, SQL Server comes with a sample database, "Pubs". This has nothing to do with public houses and is, in fact, about book publication. But it is worth exploring and provides useful sample tables which you can inspect to see how SQL Server works.

If you navigate through Databases, Pubs, Objects and Tables you find a collection which includes authors, discounts and so on (Fig 6). Double-clicking on, say, authors (or right-clicking and choosing the appropriate option) allows you to view and edit the structure of the table. Clicking on the Advanced options is useful (Fig 7).

For those who have used other client-server RDBMSs the options available here will seem normal, but for people who have most experience with Access it may seem rather restrictive. For example, you cannot change the data type of an existing field; you can add but not delete existing fields. There is no reason why these facilities shouldn't be offered, it just hasn't been common in the past with this sort of

RDBMS. You are expected to juggle data between tables if you want to make such a change. Perhaps the long-awaited SQL Server 7.0 will be more Access-like and less stuffy?

In fairness, SQL Server goes some way towards this already, and it also has some useful wizards which are worth investigating. A good example is the Maintenance wizard (Fig 8). Click on the button in the toolbar (the one with the wizard's wand) and it will fire up. It asks questions about the frequency with which your data changes, how much it grows, and how you want it backed up.

Other databases

As well as Pubs, you will find several other databases, including Master and Model. Master controls the operation of SQL Server as a whole: it contains a set of "system" tables for the complete installation, rather than for any one database. Model, however, does affect individual databases since it is a template for any subsequent databases which you construct. Any change to the structure of Model is reflected in every subsequent database that you create.



Next month

There is, of course, more to SQL Server. We can't cover all of it, but during the next few issues I'll point you at the bits which are important for upsizing an Access database.

PCW Contact

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■ Mark Whitehorn's book, *Inside Relational Databases*, is available through PCW Reader Offers. See pages 312/313.



Movers and **shakers**

Nigel Whitfield nods you in the direction of the real action on the net. And, all about a mover: how to get your gifs animated — it's easier than you think and makes your pages more attractive.

Only a couple of years ago, the internet was the latest trendy fad; something that was written about in every magazine (including some which wouldn't normally cover computer subjects) and was talked about incessantly.

Glitzy fashion victims turned up, eyes glazed, at the opening of cyber-cafés, while people who'd been using it for ages wondered what all the fuss was about.

The fuss, of course, was the world wide web. It made the internet easy to use, with everything just a few clicks away, and it is the web more than anything else which has brought the internet pretty close to compulsory for people who want to make the most of their computers.

Those who had been using the net for longer already knew about the other useful

resources on it: the vast repositories of useful files, or the conferencing and chat facilities, or simply email. But it took something as simple as the web and low-cost access, pioneered by the likes of Demon Internet, to make everyone take notice.

Of course, the web is packed with useful information but it's also a victim of its own success. Many people, especially new users, complain that it's hard to find things, or that they simply don't know where to start. For some, that may be reason enough not to bother with the internet on a new computer — but they'll be missing out.

The real action now is not necessarily on the web; it is built into applications and utilities, sometimes in the form of menu options, which will simply launch your browser for you with the online manual, but

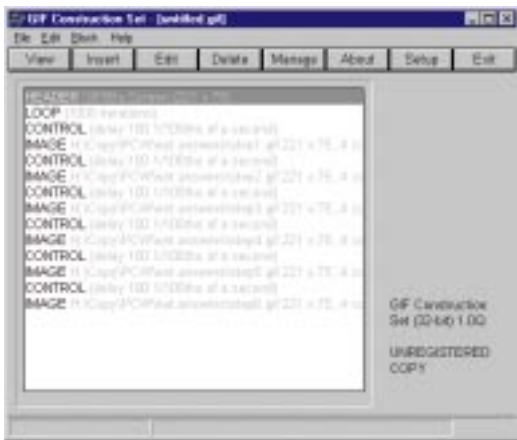
in many other cases more subtly concealed. Internet Explorer 4, for instance, downloads a small installer which then transfers the rest of the application over the net for you. Shareware allows you to register online, and other applications will check automatically to see if there's a new version, or an update which you can download to your PC. Before long, it will be commonplace for just about every major sub-system of your computer to automatically update itself if an internet connection is available.

If it all works, it's going to be a great time-saver for those who have a modem and the patience to wait for large downloads to happen. There will hopefully be the intelligence to defer an update, too, so you don't find yourself waiting for 4Mb of new browser before setting off in the morning.



Step 1 (left) The simplest way to get going is by using the Animation Wizard; you can find it on the File menu, and all you have to do is walk through the wizard answering a few simple questions. One of the first is as shown, asking if the results are to be used on a web page. Choosing "Yes" helps to make sure that the colours are optimised for different platforms

Step 2 (right) As well as deciding if you want an endless loop or a single play of your animation, you can choose the time delay between frames, which will affect how smoothly the animation runs



Step 3 (left) Having selected what you want to include, GIF Construction Set will load them and add the control elements that make the animation behave the way you want it to. You'll see a display like this and you can choose to save the animation right away, or add other elements including transitions, delays or text. As with all things, experiment, and you'll find that you can spice up your pages without forcing people to wait ages for downloads

But that's a minor niggle. Technologies like these are going to make the internet a necessity for those who want to keep their systems up to date and running smoothly. You'll know the net has started to come of age when it becomes properly integrated, helping you out in the background.

There's really only one fly in the ointment and for once it's nothing to do with the net itself. If software companies are going to deliver updates via the internet automatically, could they make sure they work before putting them on our computers?

How to make animated GIFs

If you want to make your web pages a little more eye-catching, one of the best ways to do it is with an animated GIF. Most

browsers will be able to play them, they don't need any fancy plug-ins, and the files are much smaller than a video file.

Even older browsers that cannot play the animation should be able to display either the first or the last frame, so you'll almost certainly end up with something that will satisfy all the visitors to your web page.

Animated gifs are actually fairly easy to create, depending on what you want to put in them. As with any such thing, the hard work is making the individual frames that go together to make the animation. You will need to save them all as GIFs, and to make things as simple as possible they should all be the same size. Remember, if you want the animation to play smoothly on the background of your web page, you will

need to save each individual picture with a transparent background.

If the program you are using allows it, you should also make sure that all the images are saved using the Netscape 216-colour palette, which will ensure that the colours are identical for both Mac and PC users.

As well as specifying how the different frames are embedded in an animated GIF, the standard also allows for other information, including pauses between each frame so you can control how long

the animation takes to run, or whether it should loop back to the beginning as soon as it's finished.

One of the easiest ways to put everything together is to use a specially-designed program. GIF Construction Set, from Alchemy Mindworks, is a piece of shareware that you can find at www.mindworkshop.com/alchemy/alchemy.html and the screenshots here (Steps 1-3, p235) show how you can use it to create a simple animated gif from a group of individual images.

Questions & Answers

Q I have recently changed my phone company to a cable company (Telewest) and can remember having read some time ago about cable modems being developed for faster access. Can you tell me whether my memory serves me right and, if so, when I can expect to be able to get one?

A Cable modems *are* being developed and there have even been some trials. There's no doubt that they have the potential to offer quite a dramatic speed increase over conventional modems or ISDN, but it's unlikely you'll see many products appearing quickly in the UK.

CableLabs, the US-based research organisation funded by cable operators, has a standard called DOCSIS (Data Over Cable System Interface Specification). In theory it will be possible for different DOCSIS-compliant modems to talk to each other, but until that happens there's a similar problem to the currently-competing 56K standards: maybe not a problem if you're buying access from a cable company, but it does mean you'd have a restricted choice of service providers.

There are still some niggles about the standard but it's possible that you'll be able to find two-way DOCSIS modems being launched around the middle of the year in the US. It could be some time after that before they appear in the UK. (Two-

way modems use the cable system in both directions; one-way modems use the cable to receive, and your telephone line to send data, rather like the satellite systems currently available.)

In short, yes, cable modems are coming and they will offer dramatic speed improvements. But don't hold your breath waiting for a choice of compatible models to reach the UK market.

Q I can get my image maps to work just fine but would like to know the exact x and y co-ordinates clicked by the client so I can use x and y in a Perl script. How do I do this?

A The simplest way to do this is to replace the image mapping program completely: in its place, use a Perl script within your own script.

Modern browsers support a form field type called "image" which has the same function as a submit button: a form with only one instance of that type of field is effectively an imagemap, albeit with rather longer-winded HTML behind it. For instance, if you have a Perl script called "process_map", then the HTML shown in Fig 1 would be required.

You will also be able to use the GET method, unless you have other fields on the form, since there are only two CGI variables returned to the script. They are called x and y. If you use the Perl CGI parsing code printed in my November '97

column, then you will be able to refer to them as

`$_{'x'}` and `$_{'y'}` in your script and take appropriate actions. A

Fig 1 Process_map HTML

```
<FORM METHOD=POST ACTION="/cgi-bin/process_map">
<INPUT TYPE="image" SRC="map.gif" BORDER=0>
</FORM>
```

Questions & Answers (cont'd)

typical use of this type of map is for a graphical button bar that you want to use to submit a form: you could, for instance, have a set of fields for name and address information with a button bar providing choices for update, delete, enter or search.

Q1 I have a two-PC peer-to-peer LAN in my house and one of the PCs connects to my ISP. Is it possible to connect the other PC to the internet without getting another modem? Would it be possible when the "internet PC" logs on to the net, for the other one to open up his web browser and, bingo?

Q2 I have three computers connected to a network and have a modem connected to one of the computers. I am using Internet Explorer 4.0 with Dial Up Networking and Outlook Express for email. Would it be possible for me to access the internet from one of the other computers without the use of a modem-sharing application? I have not had much luck with them before.

For example, how do you make the "connect to the internet using a local area network" option work? I have tried setting this option on one of the non-internet computers and logging on with the internet computer, but the former still can't access the net. If this is not possible, how do I set them up so I can write email on any computer?

A Both Q1 and Q2 are very similar questions so I'm answering them together, with the caveat that while the solutions are technically possible, many service providers will take a dim view. Ultimately, it's up to you to decide whether you should be trying to connect lots of systems to a single PC account, or paying a higher monthly charge to do it properly.

There are a number of different solutions, depending on what hardware and software you have available. If you're connecting via ISDN, one of the simplest solutions would be to use one of the small ISDN routers that perform "Network Address Translation", sometimes known as "Single User Internet Account". Simply put, this means you can set up your local network as a private version, using TCP/IP, and the router will automatically



Fig 2 If you use a mail program, make sure you put the files in a shared directory

make all the machines appear to be a single one. Remember, if you want to set up a local network you'll need to choose internet addresses that don't clash with the rest of the world: a good choice is 192.168.0.1 and sequential numbers.

If you already have a modem and do not want to invest in a hardware solution, you should look at WinGate, a piece of software designed to allow more than one system to share an internet connection. You can download an evaluation version from www.wingate.net or find out about UK pricing at www.zen.co.uk/reseller/wingate.

If you only want to link two machines to the net, the Lite version of WinGate is free, otherwise you'll have to pay a registration charge. Both the Lite and Pro versions provide web cacheing, which helps speed up access, saving local copies of frequently-accessed pages.

If you want to use a mail program such as Outlook (or Exchange) to compose mail from any machine and have all your mail folders available whichever you use, set up your Mail control panel in Windows 95 to prompt for a profile when you start and make sure that the personal address book and folders (the .pst and .pab files) are stored in a directory which is shared, and which can be accessed with the same path on all the systems. You'll need to create a profile using the "Manual Configuration" option of the Inbox setup wizard and specify the location for the files, as shown in Fig 2.

PCW Contact

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Role play

A little tweaking and tinkering will give your hard disk a bit more room to manoeuvre. You won't notice any great performance hit, says Tim Nott, but it will give your anorak a nice little airing.

Several readers have pointed out that if you are well endowed with memory, you can improve the performance of a standalone machine by going to System Properties, Performance, File System, and changing the "Typical role of this machine" to "Network Server" rather than "Desktop Computer" (Fig 1).

What this does is optimise the machine for a higher degree of disk activity. How it does this is by caching the most recently used path and file names, cutting down on time spent searching the disk. A "Desktop Computer" caches 32 paths and 677 file names; a "Network Server", 64 paths and 2,729 filenames.

Before you all run off and try this, be warned: if you are using the original Windows 95 release or OSR1, there is a teensy-weensy problemette. To rectify this, back up the registry, then go to:

```
Hkey_Local_Machine\ Software\ _
Microsoft\ Windows\ _
CurrentVersion\ FS Templates
```

As you might guess, this stands for File System Templates; each corresponds to one of the roles. Here, you'll see three sub-entries, Desktop, Mobile and Server. The first contains no settings, as it's the default, but if you open the Server entry you'll see that NameCache is set to 40 00 00 00 and PathCache to a9 0a 00 00. These numbers are in low-byte-first hexadecimal.

A little work with the Windows calculator reveals that 0aa9 hex is 2,729 and 0040 is 64. Yes, in other words, Microsoft cocked these settings up, so what you'll end up with, if you change to "Network Server", is 64 file names and 2,729 paths. So double-click on each key in turn and swap the values. Repeat, if you want, for the Mobile entry, which is also back-to-front.

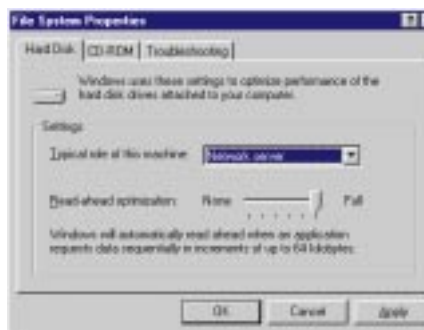


Fig 1 Changing the number of cached paths and filenames

Now you can close Regedit, go back to System Properties and change the role. If you made the mistake of doing this first, or just want to see what the actual, rather than template settings are, go to:

```
Hkey_Local_Machine\ System\ _
CurrentControlSet\ Control\ _
FileSystem
```

Here you'll see similarly-named entries copied from the templates. If they aren't there, you are using the (correct) default Desktop Computer settings. And having said all that, I don't really notice any difference in performance either way. But results, or lack of them, should never deter the true meddler from chancing his or her anorak.

Hyper-hyper

Here's a tip on the continuing saga of editing HTML in Notepad. In January's column I suggested putting a shortcut to Notepad in the Send To folder, so HTML (or any other file) can be loaded straight in without having to mess with the "Files of Type" option in Notepad's Open dialog. Mark, who runs the Glasgow Rangers web site, has a rather more elegant method:

"In any folder, go to View, Options, File types. Find the entry for HTML files and

click the Edit button at the right of the panel.

"This will open a new window with a number of options. Click on the New button, which will open a further panel with two text boxes. Into the top box, type the action you wish to perform — in this case, Edit. Then, into the bottom box, type in the path to Notepad (normally c:\windows\notepad.exe). OK this, and a new action will appear called Edit. OK back through all the boxes. Now, right click on an HTML file and a new Edit option will appear. Clicking on this will open the HTML file in Notepad."

Mark goes on to point out that you could create more actions. If, say, the default action for HTML files is to open in Internet Explorer, then you could also create an "Open in Netscape" action. It's also a good general tip and obviously isn't confined to HTML; you could, for example, give yourself the option of opening BMP files in Windows Paint or another image processor.

How fast is that modem?

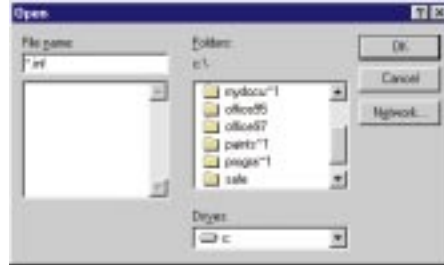
The Windows System Monitor (SYSMON.EXE) tells you just about everything you could want to know about the dynamic state of your hardware. It was obviously created by a team of idiot savants who realised that true anoraks will not only want information at their fingertips on the state of Instance Faults, but will know what these mean.

There is an "Explain" button, but this doesn't give away many secrets. The explanation of Instance Faults, for example, is "Number of Instance Faults taken per second". The Help file contains just two entries, both of which just concern the interface. Personally, I must admit I can make neither head nor tail of most of it, and at times strongly suspect the whole thing is

Over to you...

■ David Hills asks: "If you load new drivers in Windows 95 and select Have Disk, Browse, why do you get a Windows 3.x style dialog box which doesn't show long filenames or accept UNC network addresses? I tend to keep an archive of current drivers on a server, but cannot easily access them to update a client without mapping a network drive letter. Is this a bit of sentimental nostalgia on the part on Microsoft, or is there a compatibility issue behind it?"

I haven't a clue. Does anyone out there have any suggestions?



Right Have disk, but no long filenames

an elaborate practical joke.

I mean, why, having just started Windows, do I have just 2.4Kb of memory free, out of 64Mb? How come I've got 2.4Mb of swapfile in use, but the swapfile size is zero? Who cares, anyway, as long as it all works?

Well, Peter McGarvey cares. And deeply enough to have found something genuinely useful in Sysmon: "I discovered how to monitor modem performance by accident, and visible evidence of the lack of throughput from my USR x2 upgraded modem almost made me wish I hadn't.

"First, you need to enable modem logging (Fig 2). This is done in the Advanced Connection Settings dialog for your dial-up account (Properties, General, Configure, Connection, Advanced). Once this has been done and you're online, fire up the system monitor. When you select Add Item from the Edit menu, a new category is listed for your modem which allows you to see the bytes per second, sent and received."

The problem with this is that the logfile (modemlog.txt) which gets created in your Windows folder just sits there growing and

growing, so you may want to delete it from time to time.

Another possibility I found is that you can enable "Dial Up Adapter — Bytes sent/received", as well as other statistics from Sysmon, without having the logging permanently on.

On a related point, the log itself can be useful for troubleshooting comms problems or monitoring online access when more than one person is using the PC. You may notice that the numbers dialled are replaced by a series of hash signs. This is deliberate: it's a security measure designed to protect credit card and other PINs from prying eyes. If this isn't an issue, then putting E1 in the Extra Settings box will reveal the true numbers.

Oh, do shut down!

Definitely the last word on Shut Down problems. Richard Fisher emailed me to say: "It would be a terrible shame if they went through all this rigmarole without first having checked that the 'It is now safe...' message bitmap was intact: you'll find this as LOGOS.SYS in the Windows folder."

Not so clever, Dick. Not only do I know that, but I also know that if the file is removed or damaged, you get a DOS text message instead.

Time for a takeaway

Another oldie-but-goodie concerns removing items from the Programs list on the Start button. Mark Winston suggests: "One simple solution is to put a shortcut to the WINDOWS\RECENT folder on the desktop. It is then only a double-click away and its contents can be accessed or pruned as you wish."



Fig 2 Enable logging and monitor performance

Questions & Answers

Q When I run the duplicate file finder in Norton Uninstaller, I get a lot of MSCREATE.DIR files shown with zero bytes. Are these important?

Mike Green

A They are just markers, and harmless. Many Microsoft installation routines put these in folders created. If you run Uninstall or Setup to remove components, this will remove all folders that contain a file of this name but are otherwise empty. Empty folders without this file won't be removed. They are zero bytes so they don't take up disk space, so forget about them.

Q I have a 2.6Mb self-extracting, self-installing EXE file made in WinZip, containing a shareware application. I'd like to send this to someone who doesn't have email. It's too big for a floppy and I can't unzip it in order to break it into smaller chunks, as this runs the installation routine again.

Greg Swann

A What you can do is zip the file again and use multiple disk spanning to split it over more than one floppy. This is available as a free add-on to WinZip from www.winzip.com. Alternatively, you can use the DOS version of PKZIP 2.04, but you won't be able to use long filenames.

Q Is it possible to get Windows Explorer to expand the entire directory structure of a drive in the left-hand pane, much like the old tree command in DOS, without having to click on every little "+"?

Matt Wilson

A Try * on the numeric keypad. It expands everything below the highlighted folder, which can take ages if you do it from the top Desktop. You'll get error messages saying "Device not accessible" if there is nothing in a floppy or CD drive.

Q I turned off Autoplay for CDs some months ago, and can't get it back.

Andrew Watson



Fig 3 (top) Enabling Autoplay of both CD-ROMs and audio CDs. **Fig 4 (above)** Audio CDs need this default action, too

A Cor! We haven't had this one since at least last December. Go to Control Panel, System Properties, Device Manager and dig out your CD-ROM drive from the list. Click on Properties, then the Settings tab, and check that the "Auto insert notification" box is ticked if you want Autoplay enabled.

Now here's a bit we didn't cover in December: for audio CDs to play automatically you need to check the default action as well.

Go to View, Options, File Types in any folder and scroll down to AudioCD. Click the Edit button and you should see one

entry — "Play" — in the Actions box (Fig 3). The "Set default" button will toggle this between bold and ordinary type. When it's in bold, the Play action becomes the default; in other words, whatever happens when you double-click on a file, or in this case, the drive icon. The default action is also what happens when the Autoplay feature is invoked by inserting the disk (Fig 4). If you don't have the Play entry, then click the New button to create it: the "Application used..." box should contain `C:\WINDOWS\cdplayer.exe /play`

Don't forget to make this the default action after having created it.

Q I installed the RealPlayer evaluation copy. Now, every time I start Windows 95 the RealPlayer icon appears on the taskbar. As I only have an 8Mb computer I would like to stop it from loading, but it isn't listed in the Startup folder or in win.ini.

Alex Slack

A Funny you should say that. I had exactly the same thing when I downloaded and installed RealPlayer from the BBC World Service web site. It's an impressive piece of kit in that you can listen to audio (such as a news bulletin) in real time; but if you only want to use it as a browser add-on, it does get rather pushy. In this case, if all else fails, try the obvious: in the RealPlayer window, go to View, Preferences, Advanced and untick the System Tray box.

Q Who is the singer on the "Good Times" video, on the Win95 CD?

Jean Stitt

A The singer's name is Edie Brickell. Right-click on the AVI file, then select Properties for further details. This trick works with some other media files. Rush to the Windows\Media folder and you'll find that Midisoft apparently owns the copyright to the Dance of the Sugar Plum Fairy and that Brian Eno is responsible for the "Microsoft Sound".

Finding the way

Two rather fine tips from Steven Nicolaou concerning the Find feature. One is that if a folder has the focus, then F3 will open the Find dialog with the path to that folder

already filled in. The other is that you don't need to use wildcards in the "Named" box. Just typing "APR", for example, will hunt out "April Column.Doc", "W95apr98.doc" and "Windows95.apr".

PCW Contact

Email **Tim Nott** at win95@pcw.co.uk or write to him c/o the usual PCW postal address (p10).



PIF-ing and panting

DOS under Windows is further investigated by Panicos Georghiades and Gabriel Jacobs, with the focus on setting PIF files correctly. Plus, Word wrangles and hard-disk worries.

Last month we showed how to run DOS programs under Windows and set icons for them, the easy way. However, with DOS applications that access system resources directly, you need to set PIF (Program Information) files correctly so that they work properly.

When Windows runs DOS programs, they run in DOS sessions. In other words, Windows emulates a machine running DOS, thus forming a DOS sandwich: Windows running under DOS, running DOS. PIF files tell Windows how to set up the machine specifically to run your DOS program within that DOS session. This is why it is possible to have two DOS programs running at the same time, both using different settings. PIFs have different sets of parameters for Standard and Enhanced modes. When you start the PIF Editor, the dialog box contains settings for the Windows mode you are in at the time, but you can change this from the Mode menu.

Here's a rundown of PIF advanced settings, and hints about what to select:

For both Standard and Enhanced modes

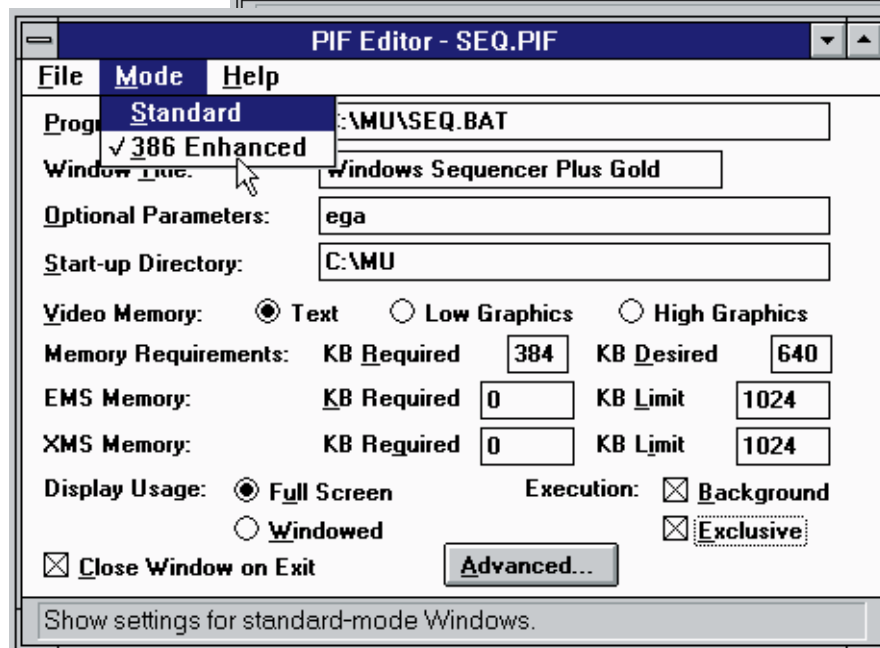
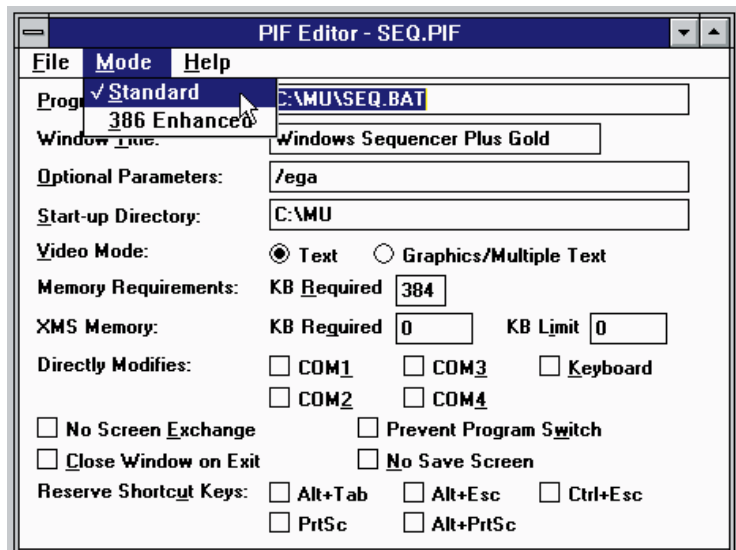
Program Filename — Full name with extension, or batch file.

Window Title — Whatever you want.

Optional Parameters — Use a question mark if you want to input these at runtime. You still need to use the / sign.

Startup Directory — The directory you want to be in when the program starts. It will be overridden if the program itself changes directory after it starts.

A rundown of PIF advanced settings for Standard (right) and Enhanced (below) modes



Close Window on Exit — Leave this unchecked if you want to see any DOS messages displayed after you exit the

application, something which can be useful for batch files, and when experimenting.

Reserve Shortcut Keys — These are keys

Questions & Answers

Q I am new to the internet and am using an old Toshiba laptop (T1900S) with a PC Card. I recently received an email written in Word with an attachment. I downloaded the document, intending to read it later in Word. I then dragged the file to my Word directory in File Manager. When I opened the file later, the attachment had somehow not been “decoded” and was nonsense.

Charly Wegelius

Charlyweg@aol.com

A When non-text (non-ASCII) files, such as Word documents, pictures and other similar files are transferred over the internet as attachments to email messages, they are first encoded by the sender’s email program into ASCII. This (garbage-looking) code needs to be decoded before you can read it. Usually this is done automatically, again by the receiver’s email program. There are many different types of codecs (coders/decoders) used, the most common being MIME and UUEncode.

If the sender’s email program does not have the decoder or can’t recognise the code, it obviously does not decode the attachment. You need to decode it yourself using an additional program. Such a program may have come with your internet software. A commonly used one is Wincode, a shareware program. What you do is save the whole email message as a text file, then pass it through something like Wincode which decodes and saves the attached file. You can then open it in Word.

If you don’t know what method was used to code your attachment, have a look at the first line (of the garbage) — it should be given there. If all fails, ask the sender how the attachment was encoded. If that sender is a Mac user, ask him or her to encode it using MIME — we have had very few problems with MIME-encoded files sent using Mac internet software.

One other point: it is often useful to get the sender to save Word files in RTF (Rich Text Format). This avoids some of the problems of incompatibility between certain versions of Word for Windows.

Q My PC’s hard disk keeps on working hard for several minutes after Windows 3.1 has opened and I cannot see why, as no applications are opened at Startup. I assume that the problem lies in the CONFIG.SYS or AUTOEXEC.BAT files, but I can’t see where.

My PC is a 486-SX with 4Mb RAM (I can just run Access 2.0 — slowly) and a 129Mb hard disk double-spaced to about 240Mb. I enclose my CONFIG.SYS and AUTOEXEC.BAT files.

Chris Vivian

c.m.g.vivian@cefas.co.uk

A It can be normal for the hard disk to go on working for a minute or so after the Windows screen shows initially, but not for a few minutes. However, your system certainly needs to do more work on its hard disk, due to the low RAM. And having a compressed hard disk increases the time taken for this work, especially when using a slow processor such as a 486SX.

Even though you have nothing in the Startup group, Windows loads drivers, accesses initialisation files and does a few other hard-disk operations when it starts. Slimming down your INI files from unnecessary (obsolete) installations may help, but frankly not a great deal. Defragmenting the drive can also help, but note that defragmenting takes longer to perform on a compressed drive. Isn’t it about time to upgrade your hardware? At least get more RAM and a larger — uncompressed — hard disk.

used by Windows for shortcuts instead of using the mouse and menus. If you check any of these options, the key combinations become available to the DOS program

instead, until you exit or switch back to Windows. Not many people realise this.

For Standard mode only

Video Mode: Text or Graphics/Multiple

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Text — Select “Text Only” if the application does not use graphics screens at all.

Memory Requirements: Kb Required — Leave at 128Kb, and raise by increments of 64Kb if more is needed. You should rarely need to exceed 384Kb.

XMS Memory: Required and Limit — Set “Kb Required” to zero if your DOS program does not use extended memory (very few do), and to -1 if it uses a lot. Try to avoid the -1 setting if possible, however, since it slows the system down. You should in any case try to estimate the value by looking at the DOS program’s data files.

Note that Windows cannot simulate expanded memory in Standard mode. This must be done outside Windows using EMM386 or a similar program.

Directly Modifies: COM1-COM4, Keyboard — This prevents different applications from using the same serial port. If you check the Keyboard box, you can prevent Windows from switching away from the application, which gives you more memory.

No Screen Exchange — Check this box if you want to conserve memory by preventing the screen being copied to the Clipboard.

Prevent Program Switch — If you select this option, you will have to quit the DOS program in order to return to Windows. Again, it is there to save memory.

No Save Screen — This is also there to save memory, but do not use the option unless you are sure that the DOS program saves its own screen information and has a re-draw command.

For Enhanced mode only

Video Memory

Text — Up to 16Kb

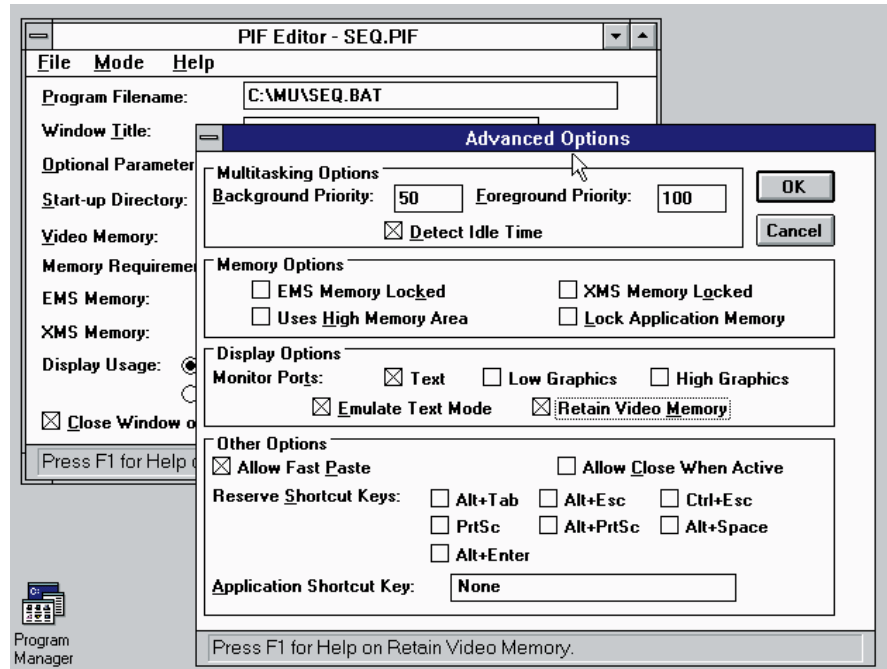
Low Graphics — (CGA) 32Kb

High Graphics — (EGA or higher) 128Kb

Memory Requirements: Required and Desired — Leave “Kb Required” at 128Kb and raise by increments of 64 if more is needed. As with Standard mode, this figure rarely needs to exceed 384Kb. Leave “Kb Desired” as 640Kb unless you know your DOS program uses little memory, in which case give an estimate of what you think is the maximum.

EMS Memory: Kb Required (0), Kb Limit (1024) — Use the default settings as indicated unless the application fails to start.

Display Usage: Full Screen or Windowed — Select Full Screen as it requires less memory. This does not prevent you from running your DOS program in a window



Click on the Advanced button in the Enhanced mode window to reveal yet more options

by pressing Alt-Enter.

Execution

Background — Check this box if you want to set the background priority time-slice in the Advanced Options, and want to allow the application to run in the background.

Exclusive — Check this box if you do not want any other application to run in the background while your DOS program is running in the foreground. This allows your DOS program more memory and processor time.

There is also a second dialog box with advanced settings, which controls how the DOS application uses system resources:

Multitasking Options

Background Priority (50) Foreground Priority (100) — Use the default settings as indicated for smooth switching between applications. You can increase the foreground setting to give the application more processing power, but if switching becomes a problem, review your settings here. These settings are in comparison only with other DOS applications.

Detect Idle Time — Keep this one checked under normal circumstances, so that the DOS program’s processing-time share will be given to other applications at times when no processing goes on. Keep it unchecked for applications that work as 3270 or 5251 emulators.

Memory Options

EMS Memory Locked, XMS memory Locked, Lock Application Memory (for conventional memory) — If any of these

boxes are checked as locked, then the particular type of memory used by the DOS program will not be swapped to disk and the program will run faster, but the rest of the system may be slowed down because memory for it will be reduced.

Use High Memory Area — Keep unchecked if you are using DOS 5.0 or later.

Display Options

Monitor Ports: Text, Low Graphics, High Graphics — Try checking one of these three if the display is not restored properly after switching from an application.

Emulate Text Mode — Keep this option checked unless you get garbled text, or if the cursor is in the wrong position.

Retain Video Memory — Check this if the DOS program uses different video modes during operation.

Other Options

Allow Fast Paste — Clear this box if you have problems pasting into an application.

Allow Close When Active — Though checking this option allows you to close Windows without exiting the DOS program properly (using its Quit option, or whatever), you may lose data or corrupt files if you do so. This is especially true of databases, word processors and accounting packages.

PCW Contacts

If you have any queries or Win3.1-related topics to discuss, contact **Panicos Georgiades** and **Gabriel Jacobs** at win3.1@pcw.co.uk



Security guards

Any aversion you have to administrator's guides or handbooks should be shelved in the case of Windows NT — the C2 Security System is essential reading. Andrew Ward keeps a watchful eye.

Martin Shultz asks whether the Windows NT Server Resource Kit, Supplement 2, is a full resource kit or merely a supplement for owners of the original kit. In fact, although specifically billed as an update, it is to all intents and purposes a full kit, including the full text on CD of the books themselves.

I don't know whether retailers demand proof of purchase of the original kit when you buy the supplement, but if they don't, this is a legitimate and cheap way of obtaining the full kit. I've always maintained that the resource kit documentation is, in reality, the manual for Windows NT and so should be provided free of charge with the operating system anyway.

Feelings of insecurity

Following my review of the *Windows NT Server 4 Security Handbook*, Colin Simpson asks if the book covers the setting of permissions on the systemroot directory and on other files on the systemdrive. Colin makes the point that if you try to secure the

C2 Configuration Manager	
C2 Security Feature	Current Setting
File Systems	1 Volume does not use the NTFS File System.
OS Configuration	MS-DOS is installed on the System.
OS/2 Subsystem	OS/2 Subsystem is not installed.
Posix Subsystem	Posix Subsystem is not installed.
Security Log	The Security Log is configured to not overwrite events.
Halt on Audit Failure	The System will not halt when the Security Log is full.
Display Logon Message	A Logon Message will not be displayed.
Last Username Display	The previous username will be displayed at logon.
Shutdown Button	The shutdown button is displayed on the logon dialog.
Password Length	Blank passwords are permitted.
Guest Account	The Guest user account is disabled.
Networking	One or more network services are installed on the system.
Drive Letters & Printers	Any user may assign Drive Letters and Printers.
Removable Media Drives	No Drives will be allocated at logon.
Registry Security	Unable to read the current status of this item.
File System Security	Unable to read the current status of this item.
Other Security Items	Unable to read the current status of this item.

The Resource Kit C2 Security Manager will set appropriate permissions on system directories

depends on how you've configured it.

There's a simple C2 Security

systemroot directory by giving it what appears to be the correct permissions — that is, Administrators and System full control and Everyone read and execute — then quite a few programs that attempt to write to various folders, will fail. Of course, it's possible to fix these problems by adding permission to the appropriate folders on a case-by-case basis but, as Colin observes, this is a non-trivial task.

Really, if Windows NT security is important to you, and even if you don't need to ensure C2 compliance, you need to study the *Windows NT C2 Security System Administrators Guide*.

Essentially, the measures you would need to take for C2 compliance are the same as those you'd want for high-level security anyway. Remember that it is entirely wrong to assume that because Windows NT has C2 certification, your NT system will be secure. It entirely

Manager program supplied with the Windows NT Resource Kit which allows you to view and change certain security settings on your system without having to use the registry editor. This ought to help with Colin's directory permission problem. The File System Security item enables you to assign Access Control Lists for the files in the system directories.

The permissions that are applied are those defined in the file C2NTFACL.INF, but this is only the starting point. You will need to read the C2 manual and have a full understanding of all the issues involved, consider every file and folder, and modify this file yourself to suit your installation. The default settings may not be appropriate, and/or you may have different file and directory names. Your temporary directory may not be called TEMP, and your program-files directory may not be called WIN32APP: that was a historical name and is likely to be Program Files on a modern system.

Another example is that preventing Change access to the system root directory itself is usually unhelpful: the Administrator

PCW Cover CD and NT 4.0

Reader, Seyed, wonders why he can't read any PCW cover CDs under Windows NT 4.0. There are two possibilities, although the most likely is that this problem occurred through reading certain unusual CD-ROM formats under the release version of NT 4.0. Service Pack 1 fixed this bug, so it's worth re-emphasising that Windows NT 4.0 doesn't stand still: if you don't keep up to date with service packs, you are running a system with dozens of known bugs. The other, much fainter possibility is that it is the CD-ROM drive. New CD-ROM formats seem to appear with ever-increasing frequency and older drives can't read them.

Service packs can be obtained from Microsoft's download and trial centre at the following web address. Look under Service Packs at backoffice.microsoft.com/downtrial/.

group will probably want to be able to change win.ini and system.ini, and what about backup.log?

The situation worsens considerably if you are running IIS. Then, you will need to take into consideration the rights that users such as webmaster and ftpadmin should (and shouldn't) have to the various files and directories on your system drive.

Much as I'd like to carry out a full and detailed treatment of this subject, with listings of the appropriate permissions for each group of users for each file and folder on the system drive, the result would be far too long for this column and would be out of date by the time it is printed. Each new version of the various built-in components of Windows NT 4.0, such as Internet Explorer and Internet Information Server, moves the goalposts. However, some of the more important directories that the C2 Security Manager secures are shown in the accompanying list on page 261.

The problem, of course, is one of design. There simply shouldn't be files and folders, scattered arbitrarily under the system root tree, that get written to. Perhaps this will improve under Windows NT 5.0.

● In case you're wondering what C2 means, it's a security level defined in the "Orange Book", the US Department of Defense Trusted Computer System Evaluation Criteria, a publication of the National Computer Security Centre (NCSC).

Multiple modems

Having spotted that the dial-up networking client within Windows NT 4.0 Workstation allows you to combine two or more modems to increase bandwidth, Andy Moore has raised a number of questions.

The most important one is, does it work? Well, yes it does, but as usual there are a number of ifs and buts. The modems don't have to be the same type, nor even the same speed. You can combine more than two, and you can mix both modem and ISDN interfaces.

Configuring the client is straightforward: select Multiple Lines for Dial Using under the Basic tab of the Edit Phonebook Entry dialog box. You'll have to specify the telephone number individually for each device.

While that's the theory, the practice is very different. When using DUN to connect to the internet you are in the hands of your ISP, since both client and server must support multilink channel bonding for you to obtain any benefit. If your ISP does offer multilink, you will have to check whether you need to use a special telephone number. It may be that only one rack of devices has this feature enabled.

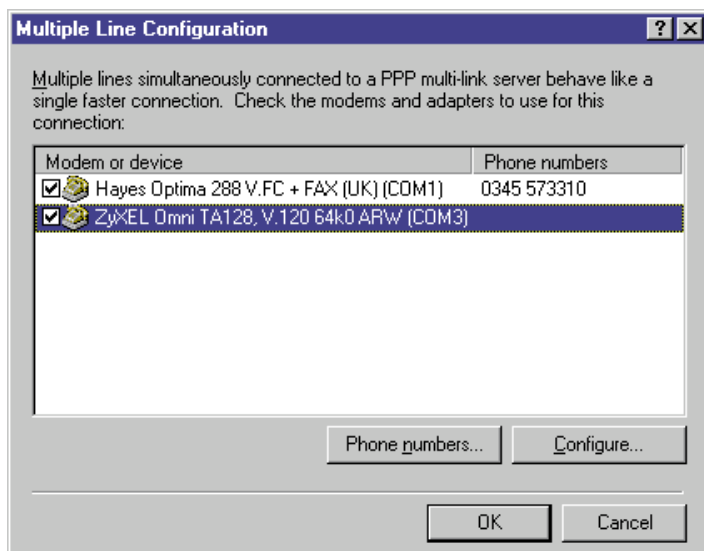
The reason Andy is interested in this feature is that, at the time of writing, ISDN is still considerably more expensive than POTS (analogue) line rental, because ISDN is charged at the commercial rate whereas POTS lines can be supplied at residential charges. In fact, ISDN works out about five times the price of POTS.

IntelliMirror

Although Windows NT 5.0 could be as much as a year from release, many of you will already have your sweaty hands on CDs of the first betas. For corporate users with a network based on Windows NT Server, one of the most attractive new features is IntelliMirror, designed to slash the cost of ownership of Windows desktop systems. Unfortunately, although server-based, the

IntelliMirror scheme also requires Windows NT 5.0 desktops before you realise the benefits; and

Multiple communications can be combined to increase dial-up networking bandwidth



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Securing your system

Some of the system files and folders you will need to secure when protecting your system.

- %SystemDrive%\IO.SYS
- %SystemDrive%\MSDOS.SYS
- %SystemDrive%\BOOT.INI
- %SystemDrive%\NTDETECT.COM
- %SystemDrive%\NTLDR.
- %SystemDrive%\AUTOEXEC.BAT
- %SystemDrive%\CONFIG.SYS
- %SystemDrive%\TEMP
- %SystemDrive%\USERS
- %SystemDrive%\USERS\DEFAULT
- %SystemDrive%\WIN32APP
- %SystemRoot%*.INI
- %SystemRoot%\LOCALMON.DLL
- %SystemRoot%\PRINTMAN.HLP
- %SystemRoot%\REPAIR
- %SystemRoot%\SYSTEM
- %SystemRoot%\SYSTEM32
- %SystemRoot%\SYSTEM32\AUTOEXEC.NT
- %SystemRoot%\SYSTEM32\CMOS.RAM
- %SystemRoot%\SYSTEM32\CONFIG.NT
- %SystemRoot%\SYSTEM32\MIDIMAP.CFG
- %SystemRoot%\SYSTEM32\PASSPORT.MID
- %SystemRoot%\SYSTEM32\CONFIG
- %SystemRoot%\SYSTEM32\CONFIG\DEFAULT.LOG
- %SystemRoot%\SYSTEM32\CONFIG\SAM.
- %SystemRoot%\SYSTEM32\CONFIG\SAM.LOG
- %SystemRoot%\SYSTEM32\CONFIG\SECURITY
- %SystemRoot%\SYSTEM32\CONFIG\SECURITY.LOG
- %SystemRoot%\SYSTEM32\CONFIG\SYSTEM
- %SystemRoot%\SYSTEM32\CONFIG\SYSTEM.ALT
- %SystemRoot%\SYSTEM32\CONFIG\SYSTEM.LOG
- %SystemRoot%\SYSTEM32\CONFIG\USERDEF
- %SystemRoot%\SYSTEM32\DHCP
- %SystemRoot%\SYSTEM32\DRIVERS
- %SystemRoot%\SYSTEM32\OS2\OS0001.009
- %SystemRoot%\SYSTEM32\OS2\DLL\DOSCALLS.DLL
- %SystemRoot%\SYSTEM32\OS2\DLL\NETAPI.DLL
- %SystemRoot%\SYSTEM32\RAS
- %SystemRoot%\SYSTEM32\REPL
- %SystemRoot%\SYSTEM32\REPL\EXPORT\SCRIPTS
- %SystemRoot%\SYSTEM32\REPL\IMPORT\SCRIPTS
- %SystemRoot%\SYSTEM32\SPOOL
- %SystemRoot%\SYSTEM32\SPOOL\DRIVERS\W32X86\1
- %SystemRoot%\SYSTEM32\SPOOL\PRTPROCS\W32X86\WINPRINT.DLL
- %SystemRoot%\SYSTEM32\WINS

applications will need to be rewritten.

IntelliMirror provides a range of features, of which two of the most important are application management and data mirroring. The application management scheme uses a multi-pronged approach to cutting desktop administration costs. First and foremost, the entire scheme operates in such a way as to minimise as far as possible the number of programs that each user ends up with on his or her desktop. And the fewer applications a user has, the fewer support calls that will be made.

Instead of being installed to desktop machines, applications are installed to the server. The administrator can then publish or assign them to users, groups of users, or entire domains. Assigning an application will force it to appear on a user's Start/Programs menu following the next logon, although the program files themselves are only copied to the user's hard drive should they actually attempt to run the program. This scheme rather neatly

avoids the potentially bandwidth-bashing situation of pushing a large application out to many desktops in one go.

The copying process is fully automatic, and transparent to the user other than the necessary delay while files are copied. But published applications merely appear in a list of new programs that can be installed via the Control Panel, and so will only ever be installed if the user explicitly ferrets them out and demands them.

Even once installed, applications are merely borrowing a parking space on the user's hard drive. Should something fall into disuse, then after a pre-set time it will be cleared away and the space made available for something newer. This doesn't really matter, since if the user does need that program again, it will be automatically copied just like it was the first time. The same applies if a file goes missing: instead of reporting an error message, or even sighing, Windows NT will faithfully fetch the missing component from the server.

But perhaps the most interesting aspect is the way that files are installed. In the past, applications used to liberally sprinkle your hard drive with DLL files, blindly overwriting earlier versions that were usually essential to the operation of your favourite progs. In the future, to comply with the Windows NT 5.0/Windows 98 logo programme, applications aren't allowed to place DLLs, nor indeed anything else, in a common directory such as the Windows directory.

The observant ones among you will have spotted the downside of this technique, which is that you could well end up with several copies of the same DLL, thus greedily consuming precious hard-drive bytes. This shouldn't matter too much, since hard drives are getting cheaper by the minute and the other techniques already discussed for application management should liberate far more space than this will waste.

You can rest assured, however, that space will not be wasted in memory. Windows NT 5.0 won't be silly enough to load several identical copies of the same DLL. Instead, what it will do, intelligently, is only load a second copy if an application specifically needs a different version of the DLL in order to function correctly.

Double data

Data mirroring ensures that a user's data is protected at all times; anything resident in the My Documents directory will be mirrored to the server. In fact, unknown to the user, the copy that he or she works on will be the server copy rather than the workstation copy. What Windows NT 5.0 will do is to transparently mirror the data back to the workstation. Thus, if the workstation fails at any point, an up-to-date copy of the data is secure on the server.

The workstation can be removed for off-line working, perhaps from home, and data files will automatically synchronise next time the PC is connected to the desktop.

PCW Contacts

Andrew Ward can be contacted at NT@pcw.co.uk or write to him at the usual PCW address (p10).

Computer Manuals 0121 706 6000

www.compman.co.uk

Diskeeper 3.0 from your local reseller or Executive Software 01342 327477. Free 30-day trial copies of both the server and workstation versions are available for download at www.execsoft.co.uk



Do the **right thing**

It's not fun, it's far from exciting, but it's absolutely crucial that you do it: backup, that is. You've got to get it right first time, advises Chris Bidmead, as he offers a helping hand.

Dan Barlow <dan@kenya.pentacom.co.uk> reminds me that following my disk crash last year I promised more about backup in this column. "Doing regular data backups is like brushing your teeth. It's not fun or exciting, but you must do it if you want to keep your data (or your teeth) safe."

This bit of finger-wagging comes from

towards the features of their product, but their paper is nevertheless worth reading.

I came across BRU because a version of it is bundled with Official RedHat 5.0, together with an attractive X-based GUI front-end, **xbru**, that will appeal to people used to the cosy tick-the-boxes apps you get with Windows. BRU runs across a variety of Unix and non-Unix platforms,

One claimed benefit of BRU is that its storage structure is more resilient to physical tape errors than standard utilities like **tar**. On the other hand, most modern tape systems come with their own built-in error correction, and provided you don't keep using the same tape over and over again (Mistake #5, according to the BRU people) physical tape failure is rare. What I particularly like about the GNU version of **tar** is that it creates a universally readable format that can be used for transferring files between different platforms.

There are several more or less standard backup utilities for Unix: **tar** and **cpio** come with most distributions, and enhancements of these, like **star** and **afio**, are freely available for download. But deferring the fancier backup utilities until a later column, I thought I'd get stuck straight in to **tar**.

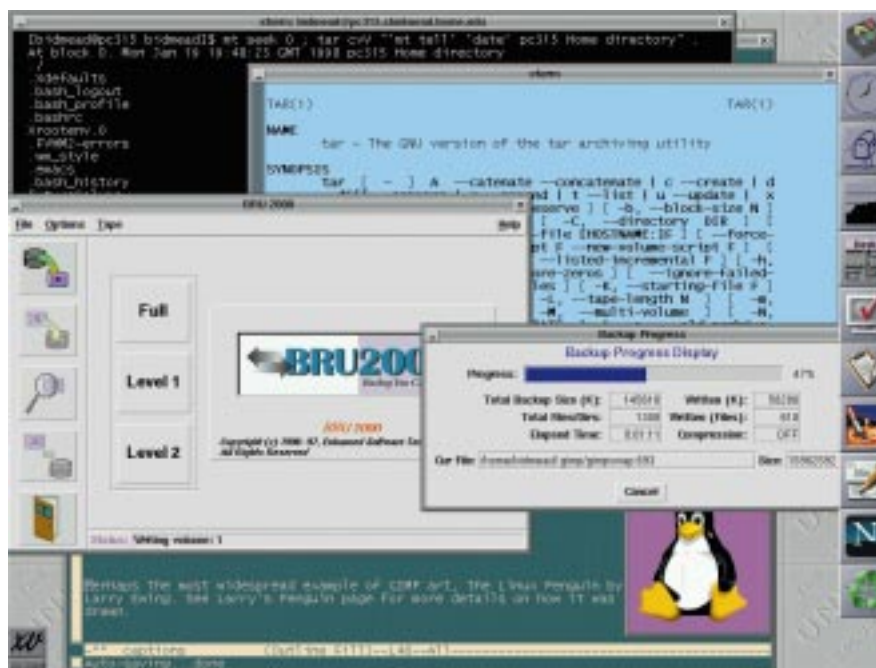
Type **man tar** for the basics, or **info tar** for the full story. In a nutshell, **tar** creates an archive, either on tape or disk, which combines whole multiple directory structures into a single file. Used by itself, **tar** doesn't compress files, but this can either be done automatically by a compressing tape drive like the HP DAT24, or — common practice — by piping the source files through a separate utility like **gzip**. GNU **tar** has a special switch to evoke **gzip** automatically.

Bidmead's Second Rule of Backup is "Do It Now, and Regularly". Bidmead's First Rule of Backup, acquired through bitter experience, is "Learn to Do it Right First".

The first time I tried to use **tar** to back up a precious hard disk, I cheerfully typed:

```
tar cvf /dev/sd0a /dev/st0
```

The "cvf" bit is a set of three switches: "c" for "create (an archive)", "v" meaning "be verbose about it (i.e. list the files as they go



Far from being a simple command line utility, as the man pages indicate (blue xterm window) **tar** opens up a world of adventure. You can see one use of it in the black xterm window behind. The **xbru** app that comes with Official RedHat 5.0 is another way of backing up that looks friendlier, but is a lot less flexible

some very useful advice to be found on the Enhanced Software Technologies web page at www.estinc.com under the link "11 Common Backup Mistakes". EST sells a commercial backup system called BRU and inevitably the advice they give is slanted

although of course you'll have to buy a licence for each one. A serious disadvantage (for me) of the so-called "personal" version supplied with RedHat is that it declines to back up external NFS-mounted filesystems.



It took me about three minutes to create the tiling behind this screenshot using the Gimp's powerful features

distributions you might find the Linux Buyers Consortium at www.polo.demon.co.uk/lbc.html worth a visit. It's run as a sideline by John

Winters, a project manager for a UK software house specialising in financial systems. John noticed that although there are a number of sources of very cheap (read "a couple of dollars") Linux distributions in the US, by the time you've shipped them to the UK they could cost four times that. The LBC was set up to order CDs in bulk and then sell them on at minimum cost to UK users.

At the time of writing, John is offering CDs at around £2 each for the first five CDs, and then £1.50 for each CD thereafter. Add £1 postage per five CDs. He has the latest version of the free RedHat (5.0), Slackware 3.4, Debian 1.3.1 and some others. It certainly works out as the cheapest source of Linux CDs that I know of in the UK, excepting Caldera's offer (see Q&A, p264).

Although John's day job is at what he calls a "rabid Microsoft house", he's worked with a huge range of operating systems over the years and is personally a keen fan of Linux, running RedHat 5.0 on his 200MHz Cyrix home-brew machine. At the end of last year John started offering the Official RedHat Linux (which comes with some commercial extras and a nice fat manual) for £40, including post and packing. Arising out of this, John has decided to convert the LBC into a commercial concern so that he can handle credit cards and make a larger investment in stock. He still intends to offer basic distributions at similarly low prices, but will broaden the product line to include a wider range of commercial packages. Excellent news. More power to you, John.

Getting hold of Linux

Derek Clifford <derek_clifford@fermi.demon.co.uk> writes:

"I currently use the Linux-FT distribution (Linux 1.2.13). Because I want to run more up-to-date software, I'd like to upgrade this to at least 2.0.x. However, there now seem to be few suppliers advertising the distribution CDs, and I think my original supplier (Lasermoon) may have gone out of business. Do you know where I can buy an up-to-date distribution? It seems a lot cheaper and more satisfactory than downloading everything."

I get this kind of query a lot. On the particular question of Lasermoon, I believe the company has regrouped under a new name with the emphasis on Java and Windows NT. Check out www.cymbeline.com. For a good deal on standard Linux

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Enter the Gimp

Years ago I remember describing a particular Apple software package as "crippled", eliciting a shocked response

Questions & Answers

Q: *Chris, I've been reading your column for several months now — from a careful distance. I haven't tried to install anything yet, though.*

A: That's fine. No hurry.

Q: *I think I've learned quite a lot about Unix. But what do I do between issues? What else should I read?*

A: If you have access to the WWW you should check out the Linux Documentation Project at sunsite.unc.edu/LDP. You'll also find some useful Unix fundamentals at Jennifer Myers' site, www.geek-girl.com/unix.html.

Q: *You've mentioned Linux, SCO OpenServer and FreeBSD in the column. Which is the best free version of Unix to install?*

A: Horses for courses. I wouldn't dream of second-guessing which would be best for you. But as some very general guidelines, I'd say that Linux probably installs on the widest range of hardware, and FreeBSD is the most solid for use as a server. SCO OpenServer and SCO Unixware are available in free versions, but beware that these have limitations, like restrictions on the number of users, and the purposes to which they can be applied.

Q: *Can I get these over the internet?*

A: Yes, but you'll need a fast connection. Here's a good tip: before you try downloading direct from, say, www.debian.org, check to see if your local ISP has copies. Demon, for example, keeps the latest Debian, RedHat, FreeBSD

and tons of other valuable stuff in various directories under ftp.demon.org/pub/unix.

As I'm a Demon subscriber I get a particularly fast link to these directories, and the resource is a real boon to me.

Q: *Falling that, where can I get CD-ROMs?*

A: Ben Partridge at Caldera's UK distributor, Avalan, has very kindly offered to send free copies of Caldera OpenLinux Lite to readers of this column who email him [<Ben.Partridge@ssgeurope.com>](mailto:Ben.Partridge@ssgeurope.com) with their snail-mail address. Highly recommended. You can check out details of what you get with OpenLinux Lite at www.caldera.com/products/openlinux.html. As an alternative, my first port of call would be the Linux Buyers Consortium (see "Getting hold of Linux", p263).

from a politically correct Apple person. "That is not a word we would use at Apple," she said. "Perhaps you mean 'restricted capability'?"

I don't know what she would make of the name of the artwork package, GIMP, written by Peter Mattis and Spencer Gimble and released under the GNU General Public Licence. But far from being "restricted", this must be one of the most capable paint programs, commercial or otherwise, on any platform.

GIMP (or Gimp, from now on) stands for the GNU Image Manipulation Program. It can be used as a simple paint program, an expert photo-retoucher, a tool for creating those irritating moving GIFs on web pages, an online batch processing system, a mass-production image renderer, an image format converter, and many other things. Although it doesn't contend with packages like Adobe Illustrator as a drafting tool, it uses editable Bezier curves for transitory shaping and masking. It also handles multiple layers, which means that a painted image can be created where all the elements retain their independence and can be individually moved, recoloured, retextured and reshaped through multiple work sessions. The transparency of each layer can also be controlled individually. Multiple Undo and Redo allows you to experiment with all the features without permanently messing up your work.

Like PhotoShop, Gimp is extensible, designed to be augmented with plug-ins. There's also a scripting interface that can

automate simple routine procedures or be used to implement complex image manipulation like the creation of menu-definable drop shadows behind text (like the blue lettering in the top right-hand corner of the Netscape page in my screenshot, page 263). Several such scripts are bundled with the standard package.

The beta version available from www.gimp.org, where you'll also find many example pictures and some extensive documentation, isn't yet 100 percent crash-proof but it's thoroughly usable. I suspect that for many readers of this magazine, whether they follow this column or not, the Gimp alone would be a justification for installing Linux.

Coping with multi-part Zip archives

Rupert Russell [<rrussell@cosworth.co.uk>](mailto:rrussell@cosworth.co.uk) writes:

"Unzipping PKZip and WinZip will span big files across several floppies. Is there really no way of unzipping a spanned archive in native Linux, or do I really have to shut down my system, reboot into DOS, do the Unzip and restart Linux? The versions of Unzip I have found preclude this."

The stuff with the Unix implementation of Zip, called Info-Zip, that you mention has never arisen here, as spanning archives across floppies is something I'd only use as a last resort to get files across to another machine that wasn't on a network. And it certainly isn't the best way of doing even this.

You'll appreciate that floppies are pretty

old technology, and the development effort of any modern operating environment is likely to be focused elsewhere. The zip format used to be proprietary, which made it less interesting for developers in the freeware field, but I see that the originator, PKWare, has put it in the public domain since I last checked. But this explains why the GNU people have in the past preferred to put their effort into tar, creating a marvellous, non-proprietary, cross-platform way of archiving and transferring files.

Having said that, if your starting point is a zipped multi-part archive across several floppies, it's no use my saying "Oh dear, I wouldn't start from here...". I notice that the **man** page for unzip says that multi-part archives are "not yet supported... this will definitely be corrected in the next release...", so there's some hope.

In the meantime, I don't think you need to resort to DOS. The Info-zip man page does discuss handling existing multipart zip archives, although I haven't tried it here. The instruction suggests copying the individual parts of the archive onto your hard disk, using **cat** to assemble them (in the correct order, I assume), "fixing" the assembled file with **zip -F** and then unzipping it.

Do you want to give this a go, Rupert? I'd love to know how you get on.

PCW Contact

Email Chris Bidmead at unix@pcw.co.uk



Faking it

Oi! Who's been sending Terence Green email with fake reply addresses? Are you trying to protect yourselves from spammers? Plus, Warp networking tips and removable drives.

At last, I have the chance to blame you readers for something, instead of always starting with an apology! Several of you have sent email to me with your "Reply To:" addresses faked. I understand why you have done this, but it isn't necessary to use fake addresses in private email. You are, after all, seeking a reply from me!

Although the faking of addresses can be an irritant and is, in fact, contrary to the rules and spirit of the internet, many people do it because spammers cull email addresses from newsgroup (Usenet) postings. If all ISPs adhered to some basic

rules such as validating domain addresses, there would be less spam... but not *no* spam. So, although they are an unpleasant menace, spammers are taking advantage of lax procedures in much the same way that drivers who park in dangerous positions on double yellow lines rely on the police being too busy to deal with them.

As far as I know, spammers don't collect addresses from individual emails, so it is only when posting to Usenet that you need to consider whether to fake your address. If you *are* going to fake your address, fake the portion *after* the @ sign, as in "anything@fake.yourdomain.com", because

this will bounce any spam before it gets as far as your real "yourdomain.com" and stresses your own mail domain's server.

The situation is further complicated by the way many ISPs and mail-relay services don't fully implement the mail rules. Some ISPs will always replace any faked "From:" address in mail you send with your real address as a matter of policy, but others will either ignore your changes or ensure only that the address is a valid format.

People change their "Reply To:" addresses because they know that the ISP mail server will never interfere with that, since its purpose is to direct replies to an address other than the one from which you are sending email. So, when sending email to people from whom you seek a reply, be sure that the "Reply To:" address is either blank or correct and, if it is blank, that you have not subtly faked your "From:" address.

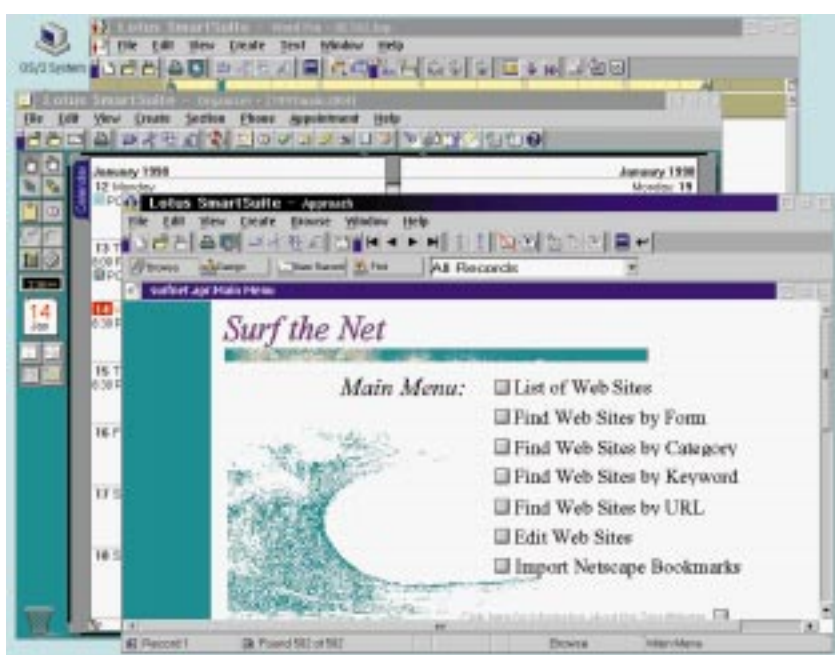
If your software allows you to alter your "From:" address, the easiest way to see how your ISP mail server handles that situation is to send yourself test emails with a variety of "From:" addresses and your real address as a "Reply To:".

Networking with Warp 3

Since the February column appeared, I've received some useful advice from Cecil Wallis on creating network connections for Warp 3. Unfortunately it's going to be a big learning exercise for me and I haven't had time to set up a Warp 3 system yet, so it's still in the pipeline.

Cecil uses a combination of IBM TCP/IP 2.0, some free NFS software, and TVFS. NFS is the Network File System from Sun; it is widely used in the Unix world and provides the communications link between Cecil's PCs. The Toronto Virtual File System

Warp 4.0 in beta!



Lotus SmartSuite for OS/2 Warp 4.0 in beta? Nearly ready to ship? Hard to believe, I know, but it's true. Here is your first glimpse of the software for which we've been waiting so long



The Iomega Zip drives work with OS/2 but it's kept pretty quiet and you have to search the web site for details

an LS-120 IDE attach driver would shortly be posted on the OS/2 Device Driver Online site service.software.ibm.com/os2ddpak/html/.

Sam noted that IBM's LS-120 driver "will not

enable him to create an NFS-compatible virtual drive for storage.

Cecil overlaid TCP/IP 2.0 onto the Warp 3 IAK. From his brief explanation the process is a trifle delicate, but he found most of the software on the internet and had it working via trial and error. He also recommends John Summerfield's site www.ami.com.au/os2/ for good advice.

Possible problems with this approach, other than technicalities, are finding a copy of TCP/IP 2.0 and dealing with the confusing collection of updates and fixes and inter-dependencies I discovered when I dipped a toe into this pond. More later.

Removable drives

Roger Vanstone wrote asking about drivers for a Mitsubishi LS-120 internal drive. He'd tried all the usual locations like Hobbess and the OS/2 SuperSite. By coincidence, the very day his email arrived, Sam Detweiler, the IBMer responsible for device driver development and support, announced that

support the parallel attach Imation drive. Imation will have to develop this driver as they won't tell us the device protocol (and we won't do proprietary drivers for free, anyhow)". He also advised OS/2 users not to use a file called os2dasd.zip at www.os2ss.com/incoming/hobbess/os2dasd.zip because it's "not a driver for the LS-120 but a bootleg and bad partial copy of the official removable media support".

Zip up

I have been sent a Zip Plus drive for evaluation. This is the latest dual-purpose SCSI/parallel port 100Mb removable drive from Iomega.

Interestingly, it works with OS/2 but you wouldn't know it; nowhere is there any mention of OS/2. But Iomega did send me a photocopy of its new advertisement flyer and there, at the end of the "supported operating system" line, was the magic word. I checked Iomega's web site and found a lot of information as well as drivers (see *screenshot, above*). The installation instructions are pretty confusing but I have managed to get it working as a SCSI device. It can be used DOS-formatted Windows compatibility or HPFS. If and when I get it working in parallel mode, I'll report back.

Quick link

David Goodenough sent in a nifty idea for a quick network link using a LapLink cable between two PCs running Warp Connect or Warp 4.

1. Install networking and the IBM Parallel Port MAC NDIS driver.
2. Assign IP addresses or NETBIOS names to the PCs and that's it!

David says LapLink cables can be bought from Byte (part number CORCB139C).

PCW Contacts

Terence Green can be contacted by post via the usual PCW address (p10) or by email at os2@pcw.co.uk



Style counsel

Style — you've either got it or you haven't. Except when it comes to WP, where there's no need to flounder: Tim Nott shares his styling secrets for achieving *haute couture* documents.

Styles are probably the single most useful thing that differentiates a proper word processor, whether it's Protext 5 or Word 97, from free offerings such as WordPad or Windows Write. Not only is it a lot quicker and easier to select "Heading 1" from a list than to choose the typeface, weight, size and other attributes piecemeal from the appropriate lists or dialog boxes, but it also makes for better consistency of formatting throughout a document.

There is, however, a lot more that can be done with styles, and a little extra time and effort put into creating them can be well rewarded. Although the following is Word-specific, most of the general principles apply to other packages.

First, remember that styles can either be global (i.e. stored in the Normal.dot template) or specific to a particular template so you can have different sets for different types of document. One neat time saver is the "Style for following paragraph".

Let's say you have a level of sub-heading that is always followed by normal

Over to you...

Now, here's a challenge. Willy Miller wants to know whether it's possible to apply hanging punctuation to justified text. I had to ask Willy what this meant and he replied that the final character of each line aligns with the right margin, but any punctuation "hangs" outside the margin. This is, apparently, a feature of some Mac software but I can't find this in any PC applications, including Quark XPress and PageMaker. Other than doing it manually with a fixed-pitch font and line-breaks, I can't think what to suggest.

■ Any bright ideas (apart from a typewriter!)?

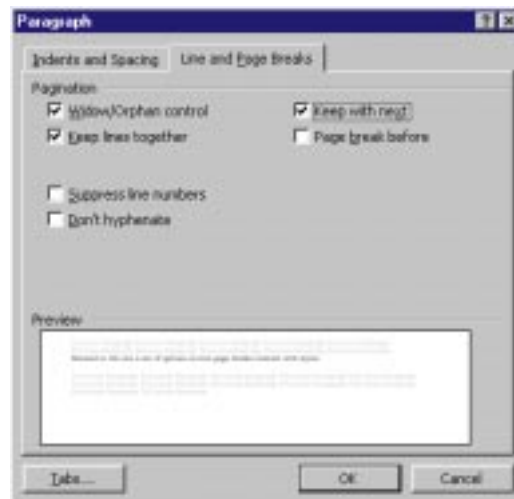


Fig 1 (left) Break dancing: keeping it all together

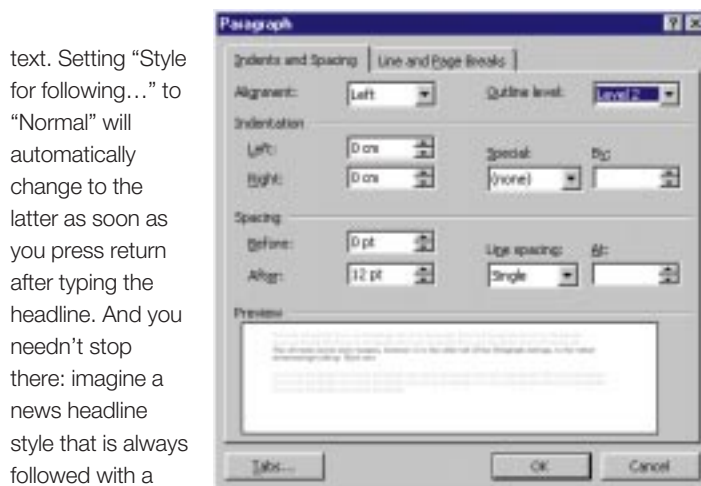


Fig 2 (below) On the level: getting them right makes life much easier

text. Setting "Style for following..." to "Normal" will automatically change to the latter as soon as you press return after typing the headline. And you needn't stop there: imagine a news headline style that is always followed with a byline, which in turn is always followed by a First Paragraph style, then a Normal style. Having started with the Headline style, you could create and format the whole story without further explicit formatting commands.

Related to this is a set of options on how page breaks interact with styles. If you open the Styles dialog, then choose New or Modify, then Format, then Paragraph, you'll eventually come to the Line and Page

Breaks tab (Fig 1). Widow and Orphan control stops a single line of a paragraph being stranded at the top or bottom of a page, but the other options are equally useful. Keep Lines Together stops a paragraph breaking at all (normally, for instance, you wouldn't want a heading breaking over two pages). Similarly, Keep With Next will avoid headings being left at the bottom of a page with nothing to head. And, Page Break Before can be useful for styles such as chapter headings.

The ultimate secret style weapon, though, is in the other tab of the Paragraph settings. Switch to Indents and Spacing (Fig

Questions & Answers

Q I am doing a technology foundation course, and we have to do our Tutor Marked Assignments on a computer. There seems to be no way of reproducing the common abbreviations for Therefore (∴ three dots arranged in a triangle) or Because (∵ three dots arranged in an inverted triangle).

Steve Peterson

A Good point, but not very good news. If your word processor has an equation editor you should be able to insert these and many other mathematical symbols. However, this is such a finicky business for a single character that I'm going to kick it into touch without further ado. It's actually much quicker to type in the words themselves.

Better news is that the Windows Symbol font has the Therefore sign in the slot used by the backslash in text fonts, so you should be able to copy and paste this from the Character Map (Fig 5) in any application, or set up a word processor shortcut key.

However, there is no Because sign. True standing-up-in-a-hammock devotees, could, I suppose, use WordArt or TextArt to invert the Therefore, but there must be an easier way.

If you have Microsoft Word, you should have a font called MT Extra. This — hooray! — has the Because sign at Q. Unfortunately, it doesn't have the Therefore sign. And just to be even more



Fig 5 Therefore's in Symbols, but not Because

annoying, the MT Extra Because is in a heavier weight than the Symbol Therefore.

Lotus Word Pro users do rather better, with a font (Math B) containing both these symbols, as do Corel WordPerfect users, with the WP Math A font containing both.

Q I write documents in English and German and use Office 95. Is it possible to switch between an English and German spellchecker within Word?

Christopher Kirkham

A The good news is that yes, you can do this. Either mark a passage as being in a particular (or no) language from the Tools menu, or set it as part of a style. The bad news is that you have to buy the additional proofing dictionaries from Microsoft. Lotus SmartSuite includes a range of spelling and grammar languages as standard.

Q Thanks for February's tip on getting Word's envelope addresses single-spaced. On a related matter, how can I stop my label addresses being double-spaced? As far as I can see, there is no relevant Style to alter, and it's a major problem given the generally limited space on most labels.

Manthos Kallios

A He's right: there is no label style, and copying and pasting from the main document doesn't preserve line spacing.

The only way I can find to do this is to replace the paragraph returns in the address dialog with line breaks (shift + return).

Q I purchased a clipart package containing 2,000 images in CGM format. When I used Ami Pro I had no trouble importing these images. But now, in Word Pro, the "Files of Type" box on the import option no longer contains this format.

Robert Howell

A Don't panic: the CGM import filter *is* provided, it's just that it doesn't get installed as standard. If you go back to the Word Pro setup program, you should be able to add it to the set of graphic import filters.

Q I have a nice new personal computer and have installed Office 97, copying over all my templates and documents from the old machine. I'm perfectly happy to delete Office 97 from the old machine under the terms of the licence agreement, but not until it's given me back my AutoCorrect settings — the fruit of many months' work. If they're not in a template, where on earth are they?

Sandra Carter

A For reasons at which we mortals can only guess, Office keeps these settings in the Windows Folder. Look for a file with the .ACL extension, and a name that identifies the user (e.g. FredFlint.ACL). Copy this into the Windows folder on the new PC, and the custom AutoCorrect entries will be restored (assuming you are using the same user name).

If the file is not there, you can find its whereabouts from the Windows Registry, at

```
HKEY_CURRENT_USER\ Software\ _
Microsoft\ Microsoft Office\ _
8.0\ Common\ AutoCorrect
```

2) and you'll find the rather uninteresting-looking Outline Level box. If you use Word's outliner, you'll realise that there's an interaction between styles and outline levels: as you promote or demote sub-headings the style changes, and vice versa (Fig 3, *overleaf*).

Even if you don't use the outliner, the Word 97 Document Map is a good way of navigating around a document, but only if you have outline levels properly set up in styles. You'll see, or be able to expand,

every outline level except body text (the lowest), so make sure that any text you don't want to appear in the Document Map is in a style that has "Body text" as its outline level. Each style can only have one outline level, although several styles can share one outline level.

Regular readers will know how I love to criticise the Word 97 developers but this is one feature they've really got right. It's brilliant for finding my way around documents such as group tests, where

reviews, verdicts, box-outs, intros and outros jostle for space.

Saving places

Reader Shane Devenshire's place-saving macros, featured in February's column, generated considerable interest. Doug Taylor points out that Word already has a Go Back command, and that "I personally think Word is right in opening at the start of the document rather than taking you to the point where the last user was. This

p270 >

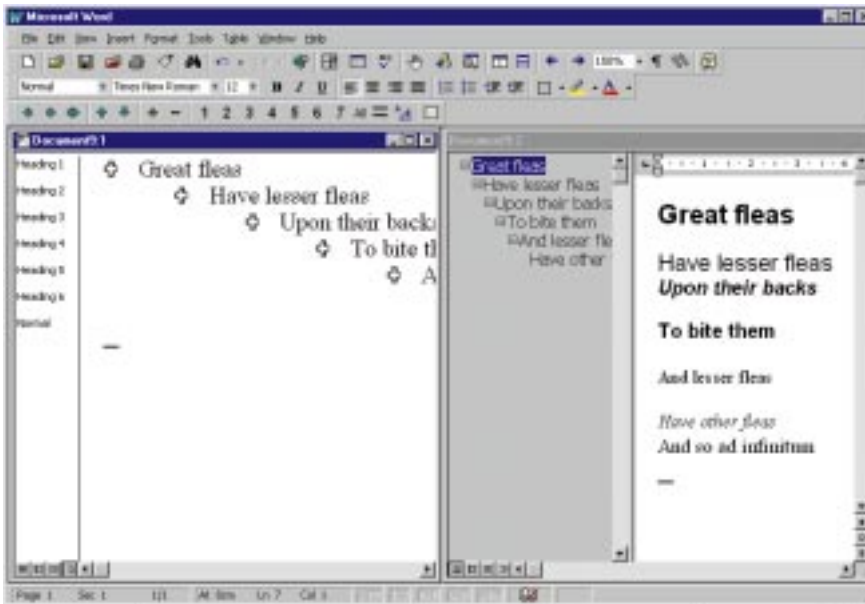


Fig 3 (above) How styles and outline levels interact

Fig 4 (right) The result of running the macro

could be very confusing if the document has many authors."

Jean Elliott also mentioned the Go Back command and was kind enough to mention the default key combination: Shift + F5.

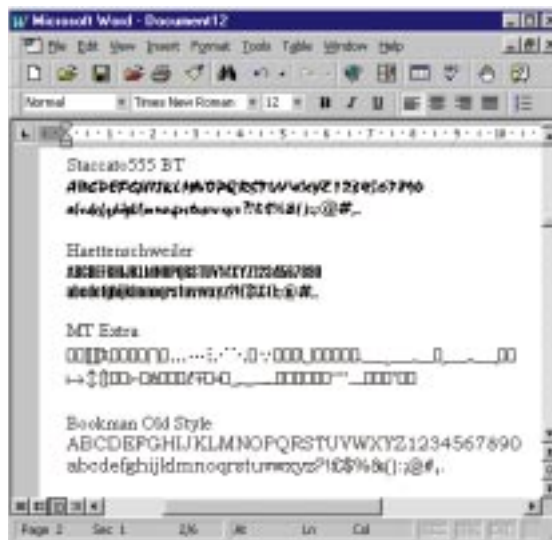
Bruce Calvert-Toulmin thought the VBA macro was just the job "as I am writing a long family history". Unfortunately, he couldn't get it to work because some printer's devilry removed a return after "Then" in the fifth line. In this case, either reinstate it or delete the "End If" line.

What I didn't realise, but Doug and Jean did, is that the Go Back command works after closing and re-opening the document. Pressing Shift + F5 will alternate (as far as I can tell) between the last editing position and the start of the document. During editing, this expands to include the last four locations of the insertion point.

'Font list macro how help Aaargh'

So went the title of Henry Bevan's email, and this said it all, really. All he wants is a list of the fonts on the system, with the name of each font shown in that font's style. Word 6 and 7 users have a macro that comes with the program (in MACROS6/7.DOT) and does something similar, printing out a sample of each font, but this doesn't seem to have survived the journey to VBA.

It soon became apparent that what Henry wanted wasn't what he needed, because the Symbol, Wingdings and other special fonts wouldn't have legible titles.



The Word 7 macro arranged the whole thing in a sorted table, gave the user a choice of point size, let you interrupt with the Esc key and gave a running commentary about how it was getting on. It also ran to three A4 pages of code, when printed out.

The version below is devoid of bells and whistles although it does tell you how many fonts you have. What it does is to show the name of each font in the default typeface (Times New Roman, unless you've changed it), followed by a sample of the font (Fig 4).

The good news is that it's only 22 lines:

```
Sub Fonter()
Dim Fonttotal
Dim Sampler$
Dim n
Documents.Add
Fonttotal = FontNames.Count
MsgBox "You have " & Str(Fonttotal) & " fonts available"
```

```
With ActiveDocument.Paragraphs(1)
.SpaceBefore = 0
.SpaceAfter = 0
End With
Sampler$ = "AaBbCcDdEe" & vbCrLf & _
vbCrLf
For n = 1 To Fonttotal
With Selection
.Font.Name = FontNames(1)
.Font.Size = 12
.TypeText Text:=FontNames(n) & vbCrLf
.Font.Name = FontNames(n)
.TypeText Text:=Sampler$
End With
Next n
End Sub
```

This is how it works

- Having declared the variables, the macro creates a new plain document, counts the fonts available, stores this in the Fonttotal variable and informs the user.
- The next four lines are just to save paper; they override the default paragraph spacing. Note that the With...End With group lets you set multiple properties of an object without having to type its full name each time.
- The next line defines a sample string and this can be anything you like.
- The vbCrLf statement inserts a carriage return, the equivalent of the old WordBasic Chr\$(13),

which also works.

- Next comes a For...Next loop, which cycles through each font in the list. For each one, another With... End With works on the Selection — in this case, whatever's about to come after the current insertion point. First it sets the current font to Times New Roman (or whatever the default is in Normal.dot) and the size to 12pt. It then inserts the font name in Times New Roman, switches to the font itself, then inserts the sample text.

There are other, more elegant, ways of doing this such as using the For Each... statement, but this is not a beauty contest and I've tried to keep it as simple as possible.

PCW Contact

You can contact **Tim Nott** by post via the usual PCW address (p10) or at wp@pcw.co.uk



Taking control

How do you control the style of data entry allowed in your applications? It can be a pain, having to standardise it all later. Stephen Wells has found a suitable solution in Excel 97.

Two readers, from different environments, have raised the matter of being able to control the style of entries permitted in their applications. Bruce Elrick works at an NHS Trust in Aberdeen, and Michael Burch is in Air Traffic Control at Salalah Airport, in the Sultanate of Oman. Bruce's problem is that the staff use a variety of data entry methods when reporting patient status and he has to standardise it all later.

Michael sent me a system he devised to enter a date automatically into a display and increment it one day at a time. But he comments: "The entries in this spreadsheet are made by clerks who have only basic computing knowledge, and so the whole spreadsheet has to be protected from errors and from 'fiddling'."

Excel 97 has many new facilities and one of them would aid both Bruce and Michael.

Microsoft diplomatically calls it "Validation". I have created a simple fictional application (Fig 1) to illustrate what it does.

You choose Data, Validation, and a dialog box is displayed, offering you dozens of options. I have limited any entries in cell C3 to a date between 1/3/98 and 31/12/98. As soon as the user clicks on C3 to start making an entry, an Input Message appears (here, headed "Enter date"). If you enter something other than a date, or a date outside that period, an Error Alert message is displayed. You can set up the wording

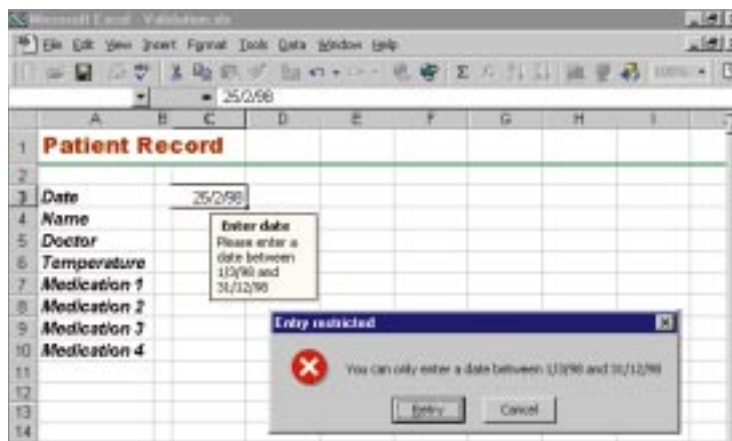
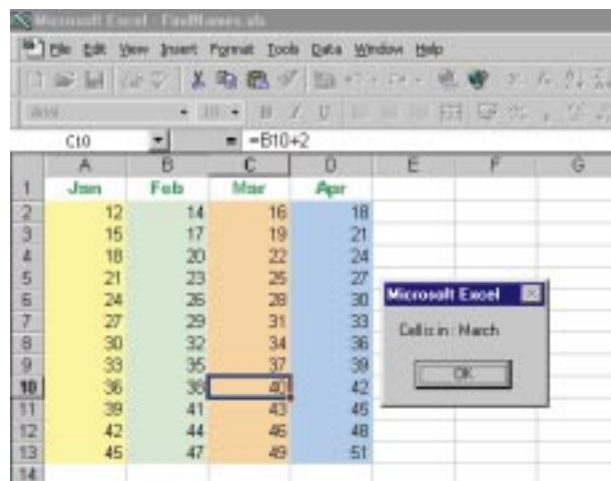


Fig 1 (above) Excel 97 makes it easy to helpfully guide a user of your application towards the type of entries you expect

Fig 2 (left) You can easily find all named ranges which contain the active cell. Use the macro on this month's cover-mounted CD



and the headings for the Input Message and the Error Alert.

The type of restrictions you can put on any cell is extensive. You could specify that a value should be either a decimal or a fraction, text of a certain length, a time within a certain period, only a whole number, or picked from a drop-down list. This could be a list of patient names or permitted medicines, which would be entered elsewhere on the sheet, probably in hidden cells.

Calling names

It is gratifying when readers let me know that one of my solutions I've emailed them has solved their problem. I am even more grateful when I hear back from someone whom I couldn't help, or referred elsewhere, and they let me know the solution they eventually discovered.

A typical case is Bill Hamilton, who originally asked: "Do you know of a construct in Excel Visual Basic to get the name of the named range containing the active cell? I'm using Excel v5. My application involves the user selecting a number from a listbox which contains many numbers. The selected number is one of many in a column in a worksheet, which is divided into sections which are Named Ranges. I need to determine (in the macro which controls the dialog containing the listbox) to which section the selected

EXCELlent little formulas

■ **Cells A1 and B1 contain financial results:** for C1 to display Profit or Loss, enter

```
=IF(AND(A1>0,B1>0),"Profit","Loss")
```

when both entries must be positive, or

```
=IF(OR(A1>0,B1>0),"Profit","Loss")
```

if only one result needs to be more than zero.

■ **Column B holds Part Numbers, each of which ends in a letter.** If the letter is S, the adjacent cell in column C should read, Sale Item. Otherwise the cell is blank. The formula to enter in cell B4 and drag down the column is:

```
=IF(RIGHT(B4,1)="S","Sale item",_
" ")
```

■ **You can easily compare two lists of names and find duplicates:** if one list is in the range A1 to A140 on Sheet1, and the other in C1 to C140 on Sheet2. In, say, cell D1 on Sheet2, enter

```
=IF(OR(Sheet1!A1=$C$1:$C$140),_
Sheet1!A1,"")
```

Enter the formula and press Ctrl+Shift+Enter. Excel will put the formula in curly brackets to indicate that it is an array formula. Drag this formula down to D140. Column D will then show any names which appear in both columns A and C.

■ **The range E5:E100 contains a list of positive and negative results.** Name the range, Results. You want cell F5 to always

display the number of results which have been more than 100. Enter in F5:

```
=COUNTIF(RESULTS,">100")
```

■ **A multi-row, multi-column block of cells contains values.** Name the cell at the top left of the block, TL. Name the cell at the bottom right of the block, BR. To find the average of all the numbers, enter in a cell:

```
=AVERAGE(TL:BR)
```

If you wish to find the number in the middle of the range of numbers, use:

```
=MEDIAN(TL:BR)
```

■ **If you want a cell to show the amount of memory (in bytes) currently available on your PC:** format the cell as a number with no decimals, and a comma to separate thousands, and enter:

```
=INFO("memavail")
```

■ **On a worksheet, column A is headed Date, contains dates and is formatted for dates. Column B is headed Quarter and is formatted General. You want to show the number of the quarter for each date.** For example, if A2 has 5/4/98 then B2 should show 2, as

Fig 3 The Lookup Wizard quickly finds a value in a list, given the row and column labels. It is great for finding prices or part numbers

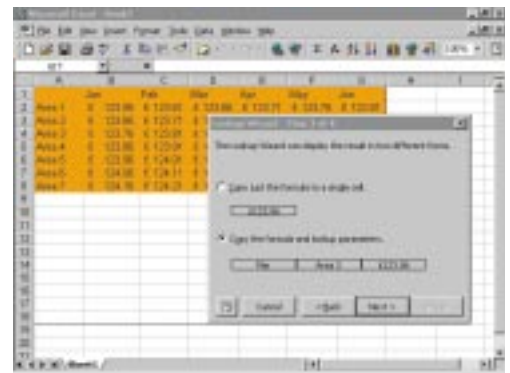
this date is in the 2nd Qtr of the year. In cell B2 you enter the following formula, then drag it down the column:

```
=INT((MONTH(Date)-1)/3)+1
```

■ **You can create a formula which finds a value by referring to row and column labels.** If the list is in the range A1:G8, the required row label is to be displayed in cell B13 and the column heading redisplayed in A13, you would enter in C13:

```
=INDEX($A$1:$G$8, MATCH(B13,$A$1_
:$A$8, ), MATCH(A13,$A$1:$G$1,))
```

The easiest way to create this formula is to use the Lookup Wizard (Fig 3). Choose Tools, Add-Ins, Lookup Wizard. Then go back and choose Tools, Wizard, Lookup. You can follow each step and the Wizard will create the formula for you. The formula is dynamic, so you can change the column heading in A13 and the row label in B13 and the found value will recalculate in C13.



number belongs. As all these numbers are in Column A, I can find the Row Number and thus the absolute cell address by doing a lookup and making it the active cell, but I then need to be able to find which section (i.e. which named range) this cell belongs to so I can carry out further processing."

I wondered if Bill might be able to deploy the UsedRange property in VBA5 (which comes with Excel97) but also recommended a more knowledgeable source for VBA questions. Meanwhile, Bill found a chap in a discussion group who pointed him to a macro in the Microsoft Excel KnowledgeBase. It was courteous of Bill to get back to me with the reference number for it. I've downloaded this macro and you'll find it in the Hands On Spreadsheets Software section of this month's CD-ROM: it finds all named ranges

which contain the active cell on a worksheet and displays the names in a series of message boxes (Fig 2). The file is NamesMac.txt.

Fresh starts

Simon Crowley asked: "How can I change the built-in header and footer from the default of 'Sheet 1' and 'Page 1' to 'None'? It's a real pain having to change the default on every new sheet printed. Also, is it possible to edit the list of built-in headers and footers?"

I suggested his fastest solution would be to set up the headers and footers he wants on a clean sheet, even if it's none, then save this sheet as a template called Book.xlt in the XLStart folder.

I also recommended that he review these Excel help files: customise the

defaults for a workbook or worksheet by using a template; create a workbook template for new workbooks; change the format or content of an existing template; use startup switches when you start Excel; restore original settings for new workbooks and worksheets; and, settings Excel can save in a template.

As to the built-in headers and footers, these are mainly taken from the workbooks properties sheet. Choose File, Properties. Whatever you enter under Title, Author and sometimes Company will appear on the headers and footers lists. Do the sheet names so you can rename them to things you want in the headers or footers.

Best practice is probably to click on the first and last worksheet tabs to group the sheets in a new workbook. Then enter whatever headers and footers are preferred

throughout. Then, right-click on a tab and choose Ungroup sheets.

Lost weekends

Elizabeth Cook has an Excel 97 problem. *"I have three columns: the first two contain dates, and in the third column I need the difference between those dates (in number of weekdays). How could I make Excel omit the weekends and just return total number of working days, Mondays to Fridays?"*

To get the total number of days, format the first two columns as dates and the third as a number. In the third column, subtract one date from the other. To provide just the number of five-day work-week days Excel has offered the Networkdays function since Version 4. It's in the Analysis ToolPak.

Q&A — XLS quickies

Q What is the fastest way of adding VAT to a value?

A If the VAT rate is 17.5%, enter 1.175 in a cell. Choose that cell, then click in the Name Box (at the left end of the formula bar). Enter "VAT". If B4 contains the amount you want to add tax to, in the cell where you want the gross amount, enter =B4*VAT

Q How can I make a drawing object align precisely with cell borders?

A Hold down the Alt key and drag the handles to resize it.

Q Is there a keyboard shortcut for opening a new worksheet?

A Use Shift+Alt+F1

Q I can freeze my headings when I display and scroll my worksheet, but how do I print my row labels and column headings on every page?

A Choose File, Page Setup, Sheet. If you want column A to print on every page, enter \$A:\$A in the box "Columns to repeat at left". If you want the top three rows to appear on every page, enter \$1:\$3 in the "Rows to repeat at top" box.

Q How can I quickly convert some date labels to true dates?

A Select the labels, then choose Data, "Text to columns" and follow the steps of the Wizard.

First choose Tools, Add-Ins, then check the Analysis ToolPak checkbox. Now when you click the equals sign on the formula bar, you'll find the function is available. This function takes three arguments — the start date, the end date, and an optional argument called Holidays.

The latter is a range of one or more dates to exclude from the working calendar (e.g. bank or staff-members' holidays). These dates are entered either as Excel date numbers or as text, using the VALUE function. As an example, you might enter your start date in cell A1, your end date in B1, and want to leave out Christmas Day last year. The formula would be:

```
=NETWORKDAYS(A1,B1,VALUE _
("25/12/97"))
```

Interestingly, Lotus 1-2-3 and Quattro Pro offer the same function with an extra argument. In this fourth argument, you can specify which days of the week are weekend days. It is entered as text. The integers 0 (Monday) through 6 (Sunday) represent the days you specify as weekend days. If you omit the third argument, 1-2-3 and Quattro Pro by default use "56", which indicates that Saturday and Sunday are the weekend days. But if you were to use "45", it would indicate Friday and Saturday as the weekend days. That facility could be handy in these times of flexible work schedules.

Synchronised scrolling

Steve Sheppardson asks: *"If I view two workbooks side by side in Excel 97, is it possible to synchronise them so that they will scroll together?"* The simple answer is, no. Conversely, if you split an Excel 97 worksheet into panes, there appears to be no option to not have them scroll together. In Lotus 1-2-3 97, you don't seem to be able to lock-step scrolling of two windows, either. But there is the option to synchronise scrolling of panes or not.

UK maps: where are they?

I haven't been much help to Bill Bassett, either. He says: *"I've been trying to find information on the mapping facility in Excel. There seems to be information on the USA maps but no information as to where I can obtain maps which cover my area in Shropshire. I've searched Microsoft online support but to no avail. I need to plot population densities down to five- or six-digit postcode levels. It seems that this is possible with Excel but I need the maps first. Any ideas?"*

The only UK web sites I could find display route-mapping software rather than for Excel, so I invite readers' suggestions.

Classifying scores

Steve Ford writes: *"Using Excel, I have written a spreadsheet to help me log results from assessments. The problem I have is, how can I have a formula that will give me*

```
IF CELL A1 IS <39 THEN "REFER",
IF CELL A1 IS >40 BUT < 64 THEN
"PASS", IF CELL A1 IS >65 BUT < 84
THEN "MERIT", IF CELL A1 IS >85
THEN "DISTINCTION"
```

There are many ways of doing this. One easy way is to drag down the numbers 0 to 100 in the cells X1 to X101. In the cells Y1 to Y101, drag down to fill REFER adjacent to 0 to 39, PASS from 40 to 65, and so on. Highlight the cells X1 to Y101 and in the Name box enter RANGE. Enter the scores in, say, A1 to A10. In cell B1 enter =VLOOKUP(A1,RANGE,2) then drag this down to B10.

Significant figures

Chris Milne is struggling to get Excel display values to a number of significant figures. So, I reviewed for him the rules of creating a custom number format.

- If the number has more digits to the right of the decimal point than there are placeholders in the format, the number is rounded to as many decimal places as there are placeholders.
- If the number has more digits to the left of the decimal point than placeholders in the format, the extra digits are displayed.
- If the custom format contains only number signs (#) to the left of the decimal point, numbers less than 1 begin with a decimal point. A number sign (#) displays only significant digits. It doesn't display insignificant zeros.
- If you use a zero as a placeholder, it displays insignificant zeros if a number has fewer digits than there are zeros in the format.
- If you use a ? as a placeholder, it adds spaces for insignificant zeros on either side of the decimal point, so decimal points align.

PCW Contacts

Stephen Wells welcomes problems, solutions or suggestions relating to spreadsheets. Write to him at the usual PCW address (p10) or email spreadsheets@pcw.co.uk



Colour coded

Red box, blue box, yellow box... Here's how to implement a system of colour coding into your tabular forms. Plus, Mark Whitehorn brings wild things and money matters under control.

A client wanted a colour coding to appear on a tabular, upcoming contacts form. The colour would vary to show the status of that contact (red meaning 'hot contact', blue meaning 'cool', and so on). My first instinct was to use an 'On Current' event to modify the background colour of the main fields in the table (this would be related to a hidden numeric status field). Unfortunately, this leads to all visible records changing — not just the one selected.

"My solution was to have an OLE object field in the related status table. The content of each was simply a colour swatch pasted in from Paintbrush. I could then create a little coloured box next to each entry, giving a visual indication of their importance. (For best results, the size mode has to be set to 'stretch'.) I am sure there must be a less cumbersome way of doing it, but at least the thing works!"

Mark C Squire
mark@computer-tutors.net

Mark's code is on the CD-ROM as an Access 97 database called COLOUR.MDB. I love it because it seems so intuitively the sort of form that users of databases would want (Fig 1). The secret is in the table called "tblRatings"; double-clicking on the field called colour should call up paint (Fig 2).



IP addresses

"I need to store network IP addresses and subnet masks in a database, and have yet to find a satisfactory way of doing it. They are of the form nnn.nnn.nnn.nnn where each 'nnn' can be anything from 0 to 255. (Net managers note; this is for the database only. Real network restrictions are irrelevant.) IP addresses have to be unique and need to be sorted numerically by each part of the address.

"Microsoft has done it — its WINS database is an MDB but is in a non-standard format, so even if you copy it, you can't open it in Access to find out how they

did it. It just states 'Unrecognised database format'. I am sure that the answer to this problem will be welcomed by the many network managers who also read your database column."

Simon West
 Senior Network Analyst
smwest@mail.somerset.gov.uk

I replied with a table made up of four fields to hold the IP address (and a couple to hold whatever text information might be required). This database is on our cover-mounted CD-ROM as IP.MDB. The four fields were of type numeric and Field Size Byte. This field size automatically restricts

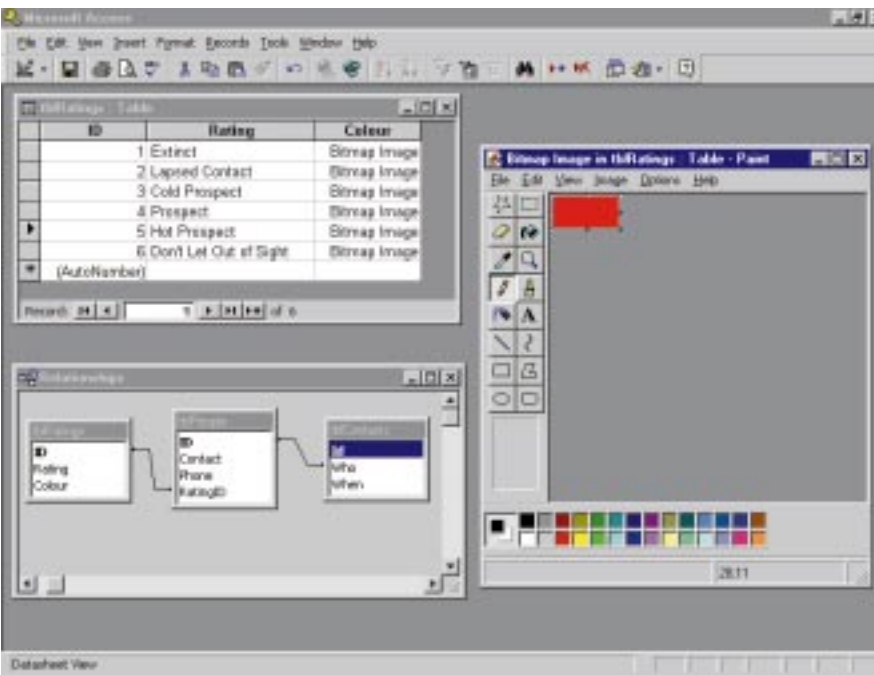
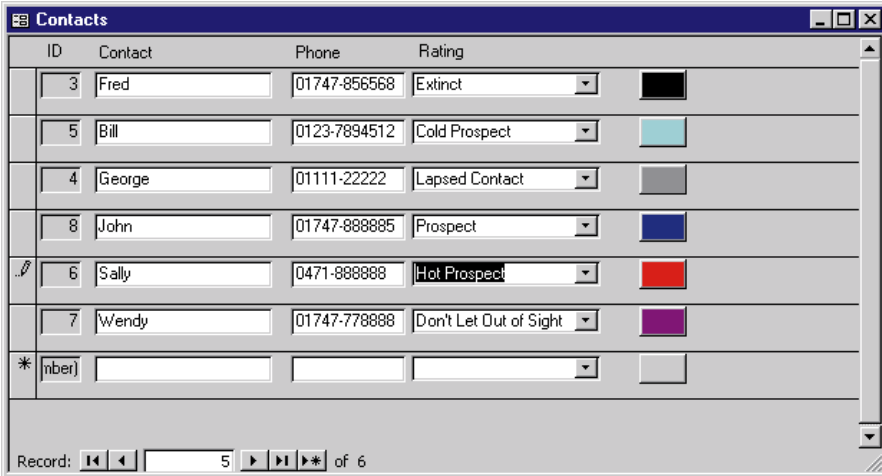


Fig 1 (top) and Fig 2 (above) Colour-code your documents using the COLOUR.MDB macro on this month's cover CD

the input to acceptable values within the range 0 to 255. Of course, you then have to use four fields, but an expression can be used to present the information in a manner which looks more like an IP address. In this case I used

```
=Str([IP1])+"." +Str([IP2])+"." +Str([IP3])+"." +Str([IP4])
```

on the form shown in Fig 3.

I received the following reply from Simon: "Thanks for the reply. I had played with all sorts of validation rules for four separate fields, but never thought of using what they actually are — byte values.

"I felt I needed to solve the simple problem of getting the form to auto tab when I press a full-stop character. I had to resort to a bit of VBA to get the focus to move when I pressed full stop. I also added

a bit of code to ignore all characters except numbers and the backspace key (although arrows, del, tab and other navigation keys still work). The only minor problem to overcome now is that if I type a number greater than 255 it allows me to, until I move focus; then it generates an error. What I need is to find the value of the edited

A temporary extension

■ If you are a database freak, you will be delighted to hear that the client-server stuff we have been looking at in this column has been spun off into the *Hands On Workshop* section (page 228). This enables us to have more questions, answers and tips in this bit, while continuing with the client-server section in a more practical way.

field before it is committed to the record, and check if that is >255."

The code fragment in Fig 4 doesn't appear in IP.MDB and you will need to modify it slightly for each of the fields. It is left as an exercise for the reader.

Wild things

"I thought I could use the wildcard expression '[abc]*', covered in your December column, to tame my too-huge phone book by breaking it down into alphabetical groups. I was thinking of a way to pass a value from the click event of a command button to a query and remembered an item you wrote, in PCW February '97, about using properties of the 'Screen' — but that would have meant ugly button captions.

"What I found worked as an alternative, was to use a hidden text box to pass the value and a command button to fill the text box with the string to be passed to the query.

"The code for the command button is:

```
Me!txtSelName.Value = "[abc]*"
```

Fig 3 The easy way to store network IP addresses and subnet masks in a database

Fig 4 Finding the value of the edited field

```
Private Sub Ctl1_KeyPress(KeyAscii
As Integer)
If KeyAscii > 59 Then KeyAscii = 0
If KeyAscii = 46 Then
DoCmd.GoToControl "IP2"
If KeyAscii < 48 And KeyAscii <> 8
Then KeyAscii = 0
End Sub
```

Fig 5 Download AIW.MDB from our CD and convert a numeric amount to an amount in words

```
DoCmd.OpenQuery "qryNameNumber"
sfrmNameNumber.Requery
DoCmd.Close acQuery, _
"qryNameNumber", acSaveNo
```

The query has as its criteria:

```
Like [forms]! _
[frmNameNumber]![txtSelName]
```

and populates a subform — and it works well, too."

Ivor Davies

[Ivor DAVIES <qc22@dial.pipex.com>](mailto:Ivor.DAVIES<qc22@dial.pipex.com>)

Money matters

"I have subscribed to PCW for years and this is the first time I have got really stuck on an Access problem. Briefly, I have created an estate agency database (originally in Access 2) and am now, three years later, trying to tweak it a little. I have a Property Description Table holding, among other things, the asking price of the property; this is a currency field. I also have a table called Offers which holds phrases such as Offers Over, Offers Around etc.

"I wish to combine these two fields in a form to produce a result such as 'Offers Over £45,000'. The expression I initially tried was

```
=[Offers]&" "&[Asking Price]
```

which produces Offers Over 45000: no £ sign and no comma. By altering the expression to

```
[Offers]&"£"&[Asking Price]
```

"I can produce Offers Over £45000, but still no comma. Altering the attributes of the expression and inserting currency has failed to help. I am hoping that this is a trivial question with a quick and simple answer. If you need to use code, then I am entirely in your hands."

Chris Aspden

ca@propertychoice.softnet.co.uk

I sent Chris a couple of pointers and he replied:

"A friend, John Knight, solved the problem, based on your idea, with the following string:

```
Offer Price: [Offers] & " £" &Mid$_
```

Going downtown

A couple of issues ago I answered a request for a list of towns in the UK. I also asked for any other, non-copyrighted lists of towns which readers might have and said that I would put them on our CD-ROM. The response was excellent — so great, in fact, that I haven't included all of them because there is so much duplication. However, grateful thanks are due to Ken Sheridan, David Stainton, Nigel Collins and Sid Wilson, all of whom were exceptionally helpful.

My original idea was to combine the town names into one mammoth list. Unfortunately, the information that was sent cannot be directly combined even though it is potentially very useful. Additionally, some of it may have been copyright, as the following letter shows:

"I am working on something for marketing information and sales areas based on postcodes. One problem is knowing what defines a town. Using postcodes means that a town is defined as what the Royal Mail calls 'a post town': in other words, that part of the address which should be in capital letters and comes before the county and postcode lines.

"I use the excellent 'Postcode' software from AFD Software to integrate postcode lookup into my Access forms: you enter the

postcode, press the button and the address is filled in, leaving you to just add the street number. Using this method ensures that the address information is always correctly formatted and that the various bits of the address are in the right fields.

"I am also including 'tblCountry' which lists all the countries I can find, their dial codes and a country code. I have made up some of the alphabetic country codes so I would be very interested in a definitive list of these, if such a thing exists. By the way, does anyone know why the Blackpool area uses FY as its letters?"

Nigel Collins

[<mantec@cablenet.co.uk>](mailto:mantec@cablenet.co.uk)

All of the lists which weren't copyrighted are on the CD-ROM in an Access 97 database called TOWNS.MDB. Access 2.0 users fear not — also on the CD-ROM is the same information as the following text files:

- NigelTwn.txt
- NigelCty.txt
- Ken.txt
- David.txt

By the way, I share Nigel's enthusiasm for AFD's software, which I have looked at in previous columns (see www.afd.co.uk/toc.htm).

```
(Str$([AskingPrice]),2,(Len(Str$([AskingPrice]))-4) & ", " & Right_
(Str$([Asking Price]),3)
```

"I'm sure you understand this better than I, but it did solve my problem when I tried it and I am grateful to you and John for sorting me out."

Cheque it out

"I have vague memories of reading about a function to convert a numeric amount to an amount in words, as used in cheque printing. I decided that it was probably quicker to re-invent the wheel than find the needle in the haystack. So, I attach an Access 2 database, AIW.MDB."

George Herrick

It works (see Fig 5) and must surely be useful to other people, so a copy is on our PCW CD-ROM: AIW.MDB is an Access 97 file, AIW2.MDB is from an earlier version of Access. Also on the CD-ROM is a file called AIW.TXT, which is a text file of George's code.

Postcode validation

"I was very impressed with your column in PCW December and especially interested in the Male/Female validation issues. There is one problem, which has been puzzling me on and off for some time, you might like to

consider:

"Access comes with a standard validation for US zip codes but not for UK postcodes. I have been putting together a database of friends and contacts, and a number of issues have arisen. The field mask I ended up with was

```
">LL00\ 0LL"
```

though I am not 100 percent sure this is right (trial and error).

"This then leads to question 2: If you get the code right for the UK, is it possible to 'override' masks when not appropriate — e.g. use US zip code when contact happens to be in US? Obviously, widening the conditions invalidates the point of having the code in the first place! The alternative to having two fields per record seems a waste, and anyway, I have contacts elsewhere in Europe with codes which match neither."

Peter Chleboun

Peter.Chleboun@btinternet.com

In a 1995 edition of this column, I looked in some detail at the subject of postcode validation. Regular readers will, I hope, forgive me for raking over old ground but many new readers have joined the magazine in the past two years.

The upshot of several months' discussion was that there is no — repeat,

no — input mask that will accept all allowable UK postcodes while rejecting all invalid ones. The problem is that postcodes are just too variable, as the following extract, from the April '96 *Hands On Databases* column, demonstrates:

"I used to like input masks, now I'm not so sure. Having thrashed the phone number one to death two months ago, I thought I was safe, but no. As David Probett has pointed out, the input mask for Access which I suggested (>LL0a\ 0LL) is unsuitable for postcodes like B1 2BC... Arghhhh! In this electronic age, why don't the committees which design entities like postcodes do so with an eye to databases?"

"David kindly suggested (>LA9a\0LL;0_) which will allow all the correct forms but also allows mutants like D23 4HN. This isn't David's fault; the problem is the variability of the codes themselves.

"I still think the only real cure is to use Access Basic. Does anyone have any code they would like to share?"

In 1998 I am still convinced that the only real cure is code. In addition, a code-based solution could be expanded to cope with US zip codes and European variations.

No-one came back with code at the time, but someone out there must have worked on this, surely?

■ *Would anyone care to swap code for a copy of my book?*

Brought to book

"Got Feb's PCW, and your book is advertised there. I was wondering what version the Access files are in? I've only got 2.0, and haven't the pennies to go for 97!"

G Hartland

collingwoodc2@pftp.org.uk

They are in both 2.0 and 97. In fact, had we been limited by space, we would have supplied just the 2.0 files since Access has upward, but not backward, compatibility.

PCW Contacts

Mark Whitehorn welcomes readers correspondence and ideas for the Databases column. Write to him at the usual PCW address (p10) or email him at database@pcw.co.uk

Mark Whitehorn's book, *Inside Relational Databases with Examples in Access*, is available at a special price to PCW readers: see our Reader Offers on pages 312/313.

- Also, a copy of the book will be awarded to each reader who makes a significant contribution to the *Hands On Databases* column.



A good IDE-ing place

In the current PC climate, more is definitely more. So, Roger Gann, armed with a Phillips screwdriver, gets to grips with installing a large IDE drive. Get ready for more capacity.

The architect Mies van der Rohe may have made the prophetic "less is more" remark but sadly, the universal application of his aphorism comes badly unstuck when it comes to PC hardware. Sorry, Mies, but you always want *more*, never less — no matter what anybody says — and this is certainly true of hard disks.

You may have a hard disk half the size of Wales but doesn't it fill up quickly? Yes, just when you thought a gigabyte would last you a lifetime, along came new software that positively devours hard-disk space for breakfast: bloatware like office suites, 32-bit operating systems and internet caches. Even 1Gb is no longer enough!

We all need bigger hard disks. The good news is that the price of large IDE hard disks has continued to spiral ever downwards. I have said it before and I will probably say it again — they now offer truly excellent VFM. You can pick up a 6.4Gb drive for around £220 (ex VAT) — about 3p per megabyte. So, these deals on hard disks are just too good to ignore and accordingly this month's column is devoted to installing a new, large IDE drive.

How to do it — step by step

1. Before you install your new drive, take a few elementary precautions. Before touching any electronic components, you should ground yourself and discharge any static charges you've built up. You can do this by touching an unpainted metal part on the case of the computer or any metal device that's plugged in, such as a lamp.

If you're feeling ultra-cautious you might even want to purchase an anti-static wristband which is worn when you're working inside your PC... Oh, and wash

your hands while you're at it.

2. Some other essential precautions: if you want to copy the contents of your old hard disk onto the new, then you should back up your old hard disk.

Alternatively, consider investing in PowerQuest's DriveCopy utility. This £25 goodie considerably simplifies the transfer of data from old to new. You simply install the new drive as the master (see step 7), the old one as the slave and boot from the DriveCopy floppy. The data and system transfer is then automatically performed.

This, of course, assumes that you're happy with the way the old drive was set out. Call me old-fashioned, but I much prefer to start from scratch and reinstall everything anew.

3. Next, prepare a system floppy disk, i.e. one you use to boot your PC. Either do this from File Manager or Explorer or use `FORMAT A: /s` from a DOS prompt. Then copy `FDISK.EXE` and `FORMAT.EXE` to the floppy. Copy `SYS.COM` for good measure.

If you want to use the CD-ROM drive to reinstall software afterwards, add the CD-ROM DOS drivers to the floppy as well.



Fig 1 It's easier to slide the new hard drive into one of your PC's forward-facing bays. However, installing it inside the case, perhaps under the floppy drive, leaves more room for extra devices

Check it to make sure that it actually boots. Make a note of the new drive's parameters (cylinders/heads/sectors per track). You'll find this information either on the drive or its wrapper, or in the manual. Additionally, note which is Pin 1 on the ribbon connector and remember it!

4. Power down the PC, unplug it from the mains and disconnect all other leads. Take the lid off the PC. It will be held on by four or five self-tapping screws and you'll most likely need a Phillips screwdriver to undo them. Put them in a safe place.

5. Locate the old hard disk: it might be in a drive bay, under or over the power supply or adjacent to the floppy drive. Unplug the grey ribbon cable and the small power plug from the back of the drive. Then undo the bolts holding it in place and slide it out of the drive bay.

You may be able to remove the plastic blanking plate at the front of the bay and slide it out forwards, but there might be room to slide it out backwards. If your PC uses a slimline case, the hard disk may be tucked away under the floppy-disk drive and that may have to come out as well.

6. Check the new drive's fixings and where it's going to fit. As I'm fitting a 5.25in Quantum Bigfoot TX drive, I have no choice but to fit it in a full-size drive bay.

If you're fitting a 3.5in drive you'll have a little more flexibility here. Make sure you have the right mounting hardware, too, things like bolts or rails. If your new drive came with its own mounting screws, use them. If not, use the old ones.

7. Check the jumper settings of the new drive. By default most IDE drives are set at the factory to be "master" drives, so there should be nothing to alter there.

If you're leaving the old drive in place, make sure that you set this to be a slave if both drives are hooked up to the same IDE channel. Check the drive label for details of the jumper settings. If you're not sure, visit the Ontrack web site at www.ontrack.com. This has a clever hard-disk jumper wizard.

Another valuable resource is Phil Croucher's Hard Disk Database, which lists over 6,000 drives, at www.electrocution.com.

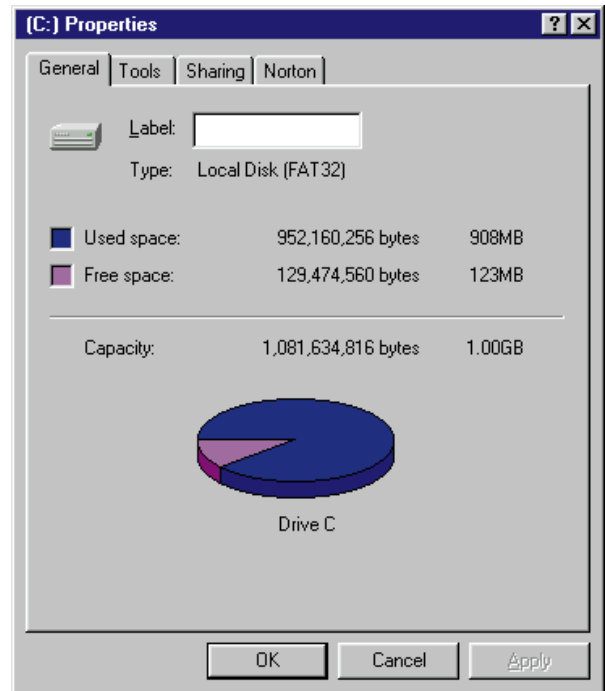
8. Install the new drive in its bay: slide it in and tighten the mounting bolts (Fig 1), attach the power cable and the ribbon cable to the new drive.

Some ribbon-cable connectors are "polarised" with a little notch and so cannot be fitted the wrong way around. If yours

In Windows Explorer, right-click on C: and select Properties to determine how much space remains on your hard drive

isn't, make sure the coloured (red or blue) stripe on the ribbon cable goes to Pin 1 of the connector on the hard disk, which is normally the side next to the power connector.

Likewise, make sure the cable is correctly orientated at the motherboard end. The power lead is also often constructed in a way that



The problem with IDE

These days it's almost impossible to buy an IDE drive smaller than 1Gb. Right now, a mere £80 (ex VAT) will buy you a 1.2Gb Seagate drive which, for even those with a short memory, is pretty amazing value.

The lack of smaller drives can be bad news for older PCs, many of which have BIOSes which can only directly support drives no larger than 504Mb. This absurdly low-capacity ceiling makes life very awkward for those wanting to upgrade their old, now comparatively tiny, IDE hard disks. The odd thing is that while a PC's standard BIOS is theoretically capable of supporting hard disks as large as 8Gb and IDE drives can reach 130Gb in size, the real size limitation is a fraction of either figure — just 504Mb.

Here's how this comes about. If you multiply out the columns, and then again by 512 (the number of bytes in a sector), you get the maximum hard-disk capacity of each standard:

• 8,422,686,720 • 136,902,082,560 • 528,482,304.

Or, to express these values in megabytes, you divide them by 1,024² or 1,048,576:

• 8,032.5Mb • 130,560Mb • 504Mb.

That's how you wind up with the half-gigabyte IDE limitation. Three years ago, this limitation was not a problem because IDE drives were no bigger than 420Mb in size. Today, the smallest drives are twice this size.

Modern PCs don't have this problem. They have BIOSes that don't use the older CHS (cylinders, heads and sectors) method for accessing a hard disk: they use Logical Block Addressing (LBA) instead, which lets them support today's multi-gigabyte EIDE (Enhanced EIDE) drives.

But what about older PCs, the ones saddled with a "CHS" BIOS? There are several solutions available. Some PCs are lucky enough to have a "flash" BIOS which is capable of being upgraded from disk to support Enhanced IDE (check with your vendor, just in case). Another solution is the purchase of an inexpensive EIDE interface card, which should set you back no more than £30 (ex VAT). This is a direct replacement for the cheap multi I/O cards fitted in older 486s. Buying such a card not only gets you LBA support but it will also give you higher data transfer speeds plus a second IDE channel. This doubles the number of IDE devices supported, to four, letting you connect EIDE drives, ATAPI CD-ROMs and tape streamers.

Finally, most large EIDE hard disks ship with special device drivers which permit the PC to recognise the entire capacity of the drive. They work by placing a BIOS overlay in the boot sector, which is the same for all IDE drives, regardless of size. The overlay is loaded as soon as the drive boots, and it provides the support for large partitions that is missing from an older BIOS.

	BIOS	IDE	Lowest value
Max sectors per track	63	255	63
Max heads	255	16	16
Max cylinders	1,024	65,536	1,024

prevents you from attaching it incorrectly.

9. Power up the PC. The new hard disk has not been “initialised” yet and so is incapable of booting. So, at this point press the DEL key (or whatever) to access your CMOS Setup program.

You now have to tell the CMOS the “geometry”: that is, the number of heads, cylinders and sectors per track, of the new drive. You can do this manually, plugging in the figures into the User Definable section, but it’s much easier to select the option which auto-identifies the new drive. Save the new CMOS settings and quit Setup.

10. Restart the PC, this time with the system floppy in the drive. Now, even though your computer can recognise your new disk, you still cannot use it until you perform two additional, related operations — partitioning and formatting.

11. Partitioning (Fig 2) is carried out using the venerable DOS utility, FDISK. Load FDISK and select option 1 from the menu, Create DOS Partition and option 1 from the second menu, Create Primary DOS partition.

For reasons of storage efficiency, avoid the temptation to make a single, humungous partition occupying the entire hard disk: make it no bigger than 511Mb. This will give you a cluster size of eight 512byte sectors, or 4Kb, which is tolerable.

By contrast, if you turn a 2.1Gb disk into a single partition you will wind up with 32Kb clusters, which is a profligate waste of disk space. Press ESC a couple of times to back out of FDISK and reboot the PC using the system floppy.

If FDISK can only “see” 504Mb of your super-huge hard disk, this means that your

Painless installation

For those interested in a quiet, pain-free installation of a new, large hard disk, they should contemplate buying Disk Manager for Windows, from Ontrack. This £60 utility can automatically install, partition and format a multi-gigabyte drive in less than a minute — and that’s fast.

It does not really matter if your PC’s BIOS or your version of DOS does not support large drives: Disk Manager automatically takes care of these shortcomings. You simply boot from the special Disk Manager floppy and follow the on-screen instructions. By default it will partition your drive into compatible FAT16 2.1Gb chunks, but if you boot from a FAT32 system floppy it will create larger FAT32 partitions on your hard disk. For one-time usage,

Disk Manager may appear expensive, but on balance it can be worth it, particularly if you are a novice.



PC’s BIOS does not support Enhanced IDE (EIDE). To get the entire capacity recognised you have two choices: you can either invest in an EIDE add-on card, or use the special software that is typically supplied with large drives.

If you have bought a truly huge drive (i.e. bigger than 2Gb) you should be aware that the largest partition possible under DOS FAT is 2.1Gb or 2,146,959,360 bytes. Hence, drives larger than this have to be partitioned into smaller logical drives using FDISK.

Assuming you have created a 511Mb primary partition, load FDISK again and this time select option 2 from the second menu, Create Extended Partition. You can then devote the remaining space on the drive to the Extended Partition. From this you can create “logical” drives.

For example, say you had a 4Gb hard

disk with a 511Mb primary partition. You could then create a 3.5Mb extended partition and from this carve out seven 511Mb logical drives.

12. You can now format the new primary partition on the hard disk. Type:

```
FORMAT C: /S <CR>
```

Not only will this format the drive, making it usable, but the /S switch copies the system tracks across. Depending on the size of the drive, this could take a couple of minutes.

The hard disk should now be bootable so you no longer need the system floppy with which to boot. Don’t forget to format the other partitions either!

Take it to the limit

And that’s that. You now have a fully-working hard disk. Unfortunately, for most Windows 95 and DOS users this month’s column only has a happy ending if you are fitting a disk that is less than 8.4Gb in size. If you buy a disk drive with a capacity larger than this, DOS — or rather, its FAT16 file system — will not let you access the entire capacity of your drive, only the first 8.4Gb of it.

In next month’s column I’ll tell you how I got on, installing a Maxtor 88400 8.4Gb and a Quantum Bigfoot TX with the amazing capacity of 12Gb.

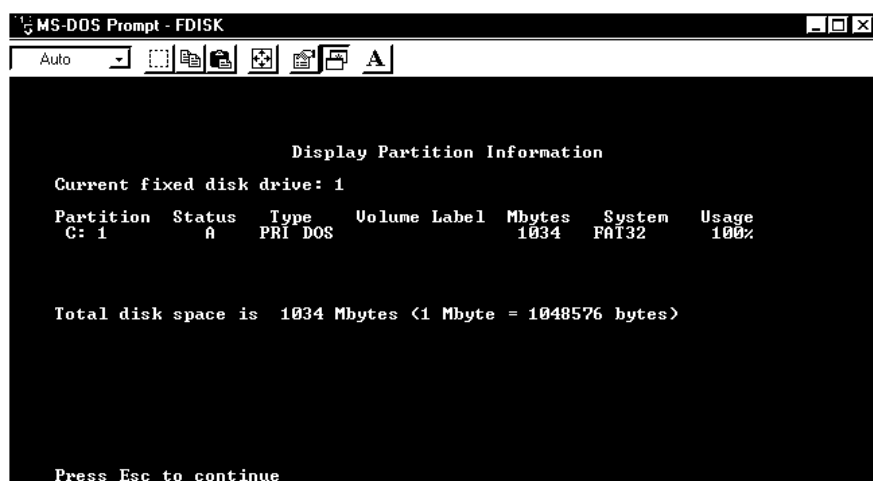


Fig 2 Partitioning is carried out using that venerable DOS utility, FDISK

PCW Contact

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Thump, tinkle and bang

Steven Helstrip and Rob Young round off their mini-series with tips on programming bass, keyboards and percussion. There's a brand new genre of sampling products to consider, too.

Over the past few months we've looked at some of those instruments which are trickiest for a MIDI programmer to emulate: drums, rhythm guitars, brass and strings. As we pointed out at the beginning of this mini-series (*Dec '97 issue*), the programmer's main aim is usually to disguise the fact that MIDI programming was used at all, which is easier said than done.

A good synth can help you along by providing sounds which bear at least a faint resemblance to their acoustic namesakes,

but even the most true-to-life synth patch in the universe can be killed stone dead by bad programming. So, to wind up this mini-series, let's take a whirlwind tour through three of the other instrument types you probably work with regularly.

Bass guitar

The bass works alongside the drums to provide the cornerstone of the beat, so chaining identical bass parts will sound as dull and synthetic as a chain of identical drum patterns — unless you're writing

dance music, of course. Although the bass guitar should work closely with the kick drum in most styles, a few incidental eighth- and sixteenth-notes, slides and fills can add life to an otherwise simple rhythm or riff.

It's worth remembering that the bass guitar is often treated as a monophonic instrument. Although it has four strings (tuned to E, A, D and G — an octave lower than the same four strings on an ordinary guitar), chords rarely work at these low pitches, other than wide spreads (such as tenths) in ballad and new-age styles.

- Avoid making bass lines too legato. A well-placed rest can sometimes be more rhythmically effective than a note. Where would reggae be if the bass played a note on beat one of the bar?
- Slap bass patches rarely have the depth to carry a whole bass line on their own. You'll generally get better results by using the Slap Bass patch just for the slaps themselves, either switching patches with program changes or using an extra channel.
- Reverb is rarely applied to bass guitars, other than in slower styles.
- Chorus, that other ubiquitous effect, works wonders in fattening up a weedy bass patch and adds presence to a "feature" bass line. Doubling it with a honky-tonk piano patch is also effective with a feature bass line.

Keyboards

A common trap into which keyboard (and non-keyboard) players fall is to believe that their keyboard parts are sloppy, having seen them in a sequencer's Edit mode. Because we humans have irregular finger lengths with some fingers stronger than others, chords will almost always be split over several ticks and their individual notes can vary widely in volume. Trying to "put

p288 >

Interface Dance

If you are looking for a good all-round dance sampling source, which CD do you choose? There must be 50 or more available at any one time, each claiming to be better than the rest.

Without judging them for yourself, let's just say that you could do worse than taking Interface Dance for a spin. On this CD you will find an eclectic range of loops, single hits, multi-sampled synths and vocals to suit ten current dancefloor genres. These include euro, techno/industrial, house/garage, r&b/hip-hop, jungle and hardcore. There's nothing much out of the ordinary by way of sounds here, just the old favourites which have been proved to work, such as the 909 kit, M1 piano, that Robin S organ and stacks of 303 riffs.

Given the wide range of styles on offer, it's no surprise that the drum loops range from a lilting 95bpm for hip-hop, right up to 180bpm to accommodate hardcore headcases. Individual percussion sounds, relevant to each style, are also included. These are often split between L/R channels to squeeze more out of the CD.

Like Eurotech, Interface Dance is one of those CDs to which you will find yourself returning time and again. If you are interested in more than one dance style, you cannot afford to be without it.

Price £59.95

Contact Time + Space
01837 841100

www.timespace.com

Rating ★★★★★



Voice FX

In last month's *Hands On Sound* we cast our eyes over the sound design package, Virtual Waves, from Synoptic. Well, if all those complex algorithms have been getting you down, and there's no sense to be made of the formant wave functions, then take a look at Voice FX.

Here, we have a bank of 40 preset

effects based on some of the most useful tools from Virtual Waves. There's no intricate patchwork to speak of and you don't need a working knowledge of spectral modulation to come up with some natty effects.

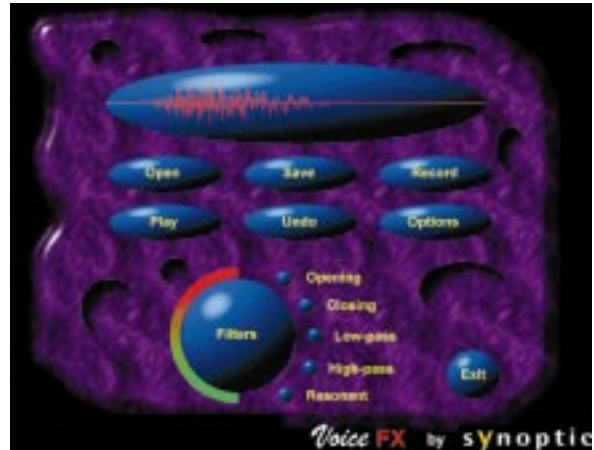
It's not just for voices, either. Any sound can be loaded up and put through as many effects as you wish, and in any order. The preset effects are grouped into eight categories, imaginatively titled: robots, transmissions, volumes, acoustics, aliens, delirium, echoes and filters. So if you want to sound like Metal Mickey, you might want to head for the robots section. You'll also find a half-decent vocoder in here.

Bypassing the names, the effects on offer consist mainly of pitch-shift, delays, phasing, dynamics, EQ, cut-up, or a combination. The effects are strictly preset, making this package a doddle to use, but it would have been great to have had access to some of the main parameters, even if it was only the effect level.

That aside, Voice FX is great fun to use and it can work wonders if you're looking for interesting drum loops and synth sounds. It also works with larger files off the hard disk, so you could even put a complete vocal take through it.

Voice FX (see "PCW Contacts") has to be the cheapest FX processor just now and although it's not going to replace my rack of outboard gear, it's useful to have around.

■ Be sure to check out the demo on our cover-mounted CD this month.



Voice FX will twist-up your loops and do some very strange things to your Gran's voice

this right" by applying quantisation or velocity compression usually does just the opposite.

A rule worth bearing in mind in these situations is: *if a few notes need editing, edit them; if every note needs editing, junk the lot and start again!*

- **Harpsichord and clavichord** are similar to the piano in their styles of playing, but have two essential differences. First, neither has a sustain facility, other than physically holding down the keys. Second, their expression capabilities differ from the piano and from each other. The harpsichord has almost no touch sensitivity, resulting in little variation in note velocities, while the clavichord is much more expressive.
- **Organs** have three particular features which can be useful to programmers. The first is a swell pedal to control the volume —

an obvious case for the Expression controller (CC11). The second is the use of stops which allow a line to be doubled an octave or two higher or lower. Because these will be perfectly synchronised, you can just copy and transpose the organ's lead line.

Third, some synths include a Rotary Speaker effect to emulate a Leslie cabinet, usually with adjustable fast and slow speeds, adding that characteristic whirling chorus to the sound. If you don't have this effect, you can get somewhere close by adding truckloads of chorus and some vibrato.

- **The accordion** is possibly the most difficult instrument to program successfully. The main characteristic of an accordion part is in its style of playing rather than the sound itself. Being wind-driven, it takes a lot of

Take control of your visuals

To make it in the music industry these days you need more than just luck to support your tunes and ideas.

U2, by way of example, didn't get where they are today simply by making great music: their spectacular live performances, coupled with superb video and CD-ROM products, have played an equally important role in the marketing and presentation.

It should go without saying, but the further you push the technology available to you, the better chance you stand of making an impression. So, let's say you have just finished recording and mastering a demo of new tunes on your PC (and *that* wouldn't have been possible ten years ago). The next logical step is to produce the video.

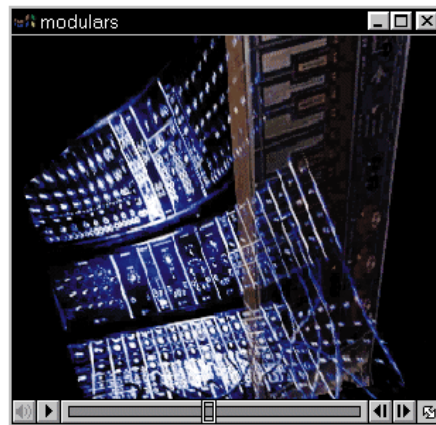
Video Creative Essentials

The Video Creative Essentials range, from Zero-G, has been put together for bands and artistes who want to take an extra step.

Whether you are interested in producing a full-blown video, require some interesting visuals for a stage show, or simply need to spruce up your web page, there are five volumes each containing around 60 clips of futuristic 3D animations and treated video footage. The clips last around 12 seconds each and use Apple's Video CODEC, based at a resolution of 320 x 240. This makes for easy integration into Adobe Premiere, Real Video and even Cubase and Logic. Each volume is supplied with a "tryout" version of

Premiere, enabling you to piece together full-length videos and add even more visual effects. In addition, you get 300 audio samples from the Audio Creative Essentials range, and all for less than £30.

We have checked out all five volumes and although we wouldn't recommend anyone to rush out and buy the complete set, we will recommend that you at least check out Trance Spotting (*illustrated here*). Oh, and try to imagine them moving.



Illustrated A selection of what you can find on Video Creative Essentials



careful work with the Expression controller to produce the "fading in and out" effect. For best results, keep the note velocities fixed and don't try to be subtle with the expression variations.

Percussion

In most cases, you'll treat percussion instruments like their drum-kit relatives. In other words, avoid chaining identical short parts, allow plenty of variation in note velocities and don't quantise too strongly.

Watch out for longer samples such as vibraslap and guiro which might have the

effect of dragging the beat unless they're moved a few ticks earlier. Some sounds with a slower attack, such as cabasa, can benefit from the same treatment.

Some sound effects included in modern synths, such as Roland's GS setup, can make interesting percussion sounds, too: patches like footsteps, gunshots, screams and even door-slams can replace or add to a snare or tom-tom hit. If you're looking for interesting drum and percussion sounds, try applying pitch bend to your kit: either bend individual hits as if they were tuned instruments — bending a conga with a

range of about 12 semitones, for example, can give a good tabla-like result — or add a single pitch bend event at the start of your drum track to detune the whole kit.

PCW Contacts

Steven Helstrip and Rob Young can be contacted at the usual PCW address (p10) or via email at sound@pcw.co.uk

Video Creative Essentials range (Zero-G) costs £29.95 from Time + Space 01837 841100
Voice FX costs £25 from Serious Audio 01923 442121 www.synoptic.net



True colours

Ken McMahon solves the age-old problem of printed colours being completely at odds with their on-screen versions. Colour management systems are the answer to the perfect match.

Unfortunately, it is an all too common problem: you've scanned in your pictures, decided on a background colour and set your headlines in an attractive, complementary, pastel hue with matching drop shadows. Alarm bells may have started ringing when the colour inkjet proofs you printed out didn't exactly, or even approximately, match what you had on-screen. But the new colour scheme looked pretty good too, so the job went off to the bureau and, guess what? That's right, the printed copies were different again.

The story will be familiar to anyone who has attempted to produce colour work on a desktop system. Not having the background tint you wanted can be irritating, but if a corporate logo isn't the correct colour, or the type that initially looked OK becomes unreadable, then you're in big trouble. So accurate colour from scanner to screen to printer is more than just convenient; it's essential.

Contrasting colours

The reason that colour changes (from scanner to monitor to printer — even from one monitor to another) or, to put it another way, the reason that colour is device-dependent, is primarily that each of these devices produces colour in a different way. Monitors use red, green and blue-coloured phosphors. Printers use red, green and blue inks. The difference between monitors from different manufacturers can be due to different phosphors, screen coatings and even your graphics card.

To complicate things even further, a particular monitor will not give a consistent picture throughout its life. As the components age, a very different picture will

present itself from the one you started out with. Given that consistency between two monitors is difficult to achieve, it is perhaps not surprising that when you go from one device, a monitor which displays colours using a transmitted-light RGB model, to a printer which uses reflected light and CMYK, things begin to look a little different.

Smoothing out the differences

So what can you do about it? Colour management systems (CMS) are the answer. Contrary to what the purveyors of these marvellous, yet limited miracles of software would have you believe, a CMS will not make everything OK; just much better than it would have been without them. A CMS irons out the inconsistencies to give you device-independent colour between calibrated devices. This is not to say that a particular colour will look identical on your monitor proofer and printer, just that the differences will be much less noticeable than they used to be, which is a big step in the right direction.

To understand how a CMS works, you need to know a couple of things about colour. Every device has its own colour space, a map of all the colours it is capable of producing. Colours reproduce differently on different devices because a colour which is in one device's colour space may not be in the other's.

There is a whole batch of colours your monitor can produce which your printer cannot. If you select these colours you'll get a "gamut alarm" to make you aware of the problem (in Photoshop, for example, a little exclamation mark appears next to the swatch). Even assuming two devices had the same colour space, a colour chosen on one would not necessarily map to the

same colour on another.

In order to tackle the problem of device-independent colour, the Independent Colour Consortium (ICC) was established in 1993 by Adobe, Agfa, Apple, Kodak, Microsoft, Silicon Graphics, Sun and the now-defunct Taligent. The ICC defined its purpose as "creating, promoting and encouraging the standardisation and evolution of an open, vendor-neutral, cross-platform colour management system architecture and components". By creating a profile for each device in the chain, based on its known characteristics, and making adjustments to the output, a CMS ensures that a colour output on one device more closely matches that on another.

Focus on profiles

In practice, what this involves is buying colour management software and installing it on your PC along with the relevant profiles. These are usually supplied by the CMS developer and are also available on their web sites. If you can't find a profile for your particular monitor or printer you can often get results by choosing another model by the same manufacturer, but when choosing a CMS check to make sure your devices are profiled.

You don't need to worry about finding a profile for your scanner, you can do this bit yourself. It usually involves making a scan of a test card or transparency (you'll need to provide one profile for each mode) which is then analysed by the CMS software to provide the device profile.

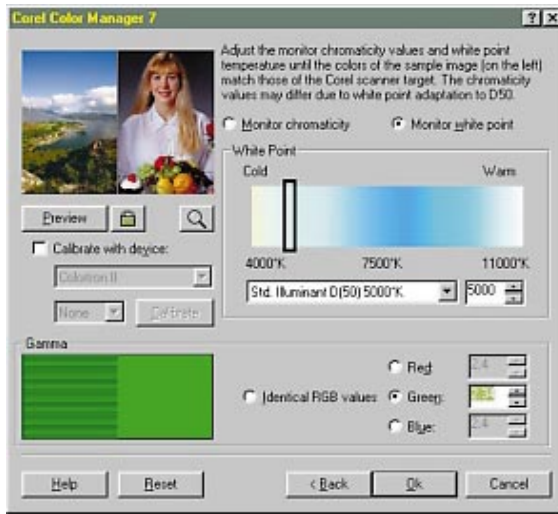
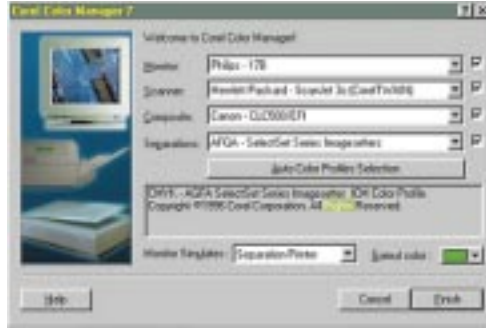
Typically, Apple has the edge on Microsoft when it comes to colour management at the system level, having introduced ColorSync along with System 7. Microsoft's ICM 1.0 has not made the same

Questions & Answers

QIn the November issue of *PCW* you asked for suggestions on future articles. Might I suggest that you cover the issues involved in calibration, by which I mean the correlation between what appears on the screen after a scan and what actually prints out? I have been trying for some months to calibrate my scanner/printer/monitor with Corel PhotoPaint and as yet have had very little success. Corel v6 does not include in its templates my particular printer (HP 870Cxi), it will not accept the printer's installation disk, and throws a wobbly at the end of the procedure by saying it cannot agree the test scan. I find the online help next to useless (I think we should all refuse programs that do not provide full working manuals) and Corel technical support for version 6 makes one feel like a second-class citizen — not that any advice I was given made sense, anyway. I would very much like to see an article covering all aspects of this particular aspect of graphics.

W English

AIf you are using v6 on the PC, I strongly suggest you upgrade to v7. If colour is important to you, it will be well worth the money. CorelDraw 7 and PhotoPaint 7 use Kodak's KCMS, and calibrating your scanner, monitor and keyboard is a



Top From Corel Colour Manager's initial screen you can select your monitor, scanner, composite colour printer and colour separations printer. Clicking Auto colour profile selection gets the information from your control panel settings...

Middle ...or you can manually calibrate your monitor

Bottom Kodak's Q-60 colour input target is one example of an IT8 standard target. Agfa supplies it free, with Fototune

Questions & Answers

reasonably straightforward affair using the Corel Color Manager.

This gives you three options for producing a profile:

- a drop-down list allows you to use one of the profiles supplied on the Corel CD-ROM;
- you can insert a disk with an ICC-compliant profile supplied by the device manufacturer (these files usually have an .ICM suffix);
- you can generate your own profile by editing an existing one, or using a device such as a colorimeter which attaches to your monitor screen and measures the output from a target area.

You can calibrate your scanner using the supplied target or, even better, a target produced to the ANSI IT8 standard. These targets are used in conjunction with a reference file and the difference between the reference file and your own scanner's performance is used to generate the profile. The target in the picture (p291) is Kodak's Q-60 colour input target.

Q I have been using PageMaker 5.0 for some time now and I would like to know whether there is a quick way to

export/save as an MS word .doc file and retain all the formatting. We have many PageMaker files that we would like to re-publish as Word documents so that we can share the info with other offices, overseas, and create HTML web pages.

Paul Angeli, Universal Media

ANo, at least not in the sense I think you mean. There's no such thing as an export filter that will let you save a PageMaker 5.0 file and open it up in Word for editing, with all the formatting intact. But you can save your PM5 files in a way that can be easily shared with other offices and published on the web, and that is to create Adobe Acrobat .pdf (portable document format) files.

Acrobat has several advantages over PageMaker as a format for distributing files between offices and over the web. The recipient won't need any of the fonts, image files or other system resources you used to create the original, neither will they need their own copy of PageMaker. All they will need is a copy of the Acrobat reader which is available free from the

Adobe web site at www.adobe.com. Using Acrobat Exchange recipients can carry out some limited editing of the files, though if you want you can prevent this and deny functions such as printing, Acrobat has built-in security features. Furthermore, if you want to distribute files via email, Acrobat's compression will reduce your file to a fraction of the PageMaker original with all its associated bits and pieces.

For publication on the web, Acrobat is the quickest and most simple way to get your online document looking the way it did when you first produced it. The Acrobat reader can be configured as a helper application for both Internet Explorer and Netscape Navigator. The alternative is to start again from scratch and re-code your PageMaker documents using HTML, but they won't look much like your PageMaker originals, you could introduce errors, and it will take a long time and cost a lot of money. So, Acrobat is definitely worth a look. It might be worth upgrading to PageMaker 6.0 which supports direct creation of .pdf files, otherwise you'll have to print your documents to disc and use the Acrobat distiller or pdf writer.

impact with Windows 95 users and we will have to wait to see if ICM 2.0, promised for release with Windows 98, closes the gap.

In the meantime, there are a number of proprietary CMSs from which Win95 users can choose. All utilise ICC-compliant profile tags to provide device-independent colour. My personal favourite is Agfa's Fototune version 2.01. It is simple to use and features a reasonably good range of device profiles. The documentation is excellent and Agfa's supporting range of publications on colour imaging and colour management are second to none.

There is a searchable database on the Agfa web site where you can enter your device and it will tell you if there is a profile available for it. You select the device type from monitors, various types of printer scanners and digital cameras. If your device isn't there, you can fill in a feedback form and, who knows? If Agfa gets enough of them, it might be persuaded to produce a profile for you. The monitors didn't include my Iiyama, but the popular ones are there including Barco, Eizo, Hitachi, NEC and Philips. There's also a generic Trinitron tag.

All are available as downloadable zips.

Kodak's KCMS is sold as an OEM product with illustration and photo-editing packages, scanner, and printers. If you have CorelDraw, chances are you have KCMS.

Pantone's Colordrive and Personal Color Calibrator, as well as ICC profiling, will help you to achieve consistent Pantone spot colours across applications: warm red 032, say, will look the same in Quark XPress as in Illustrator, Freehand or anything else. Other products to consider include ColorBlind, ScanView, Profile Maker and Color Synergy.

Monitoring your progress

Lastly, here's a word of advice about adjusting your monitor correctly and making sure the local environment is suitable for getting the most accurate results. Read the documentation that came with your display and experiment to see which settings give the best results. Even with a CMS install it's often a question of trial and error, making minor adjustments to your monitor setting to more accurately match printed proofs.

You should start out with a gamma of 1.8 and colour temperature of 5,000-7,000K. Keep the ambient light consistent (too much fluorescent light will make things look green) and avoid large expanses of vivid colour near your screen or the viewing area for proofs, as this will tend to distort your perception of the very thing about which you're trying to make an objective judgement.

You can get free advice on monitor adjustment from Epicentre at the web address below.

PCW Contacts

Ken McMahon can be contacted by post c/o PCW at the usual address (p10) or via email at graphics@pcw.co.uk

Agfa www.agfahome.com; profiles at www.agfahome.com/ftp/fototune-tags.html
ColorBlind Products www.color.com
DotPrint www.dotprint.co; run by Miller Freeman. Contains authoritative overviews of colour management systems.

ICC www.color.org

Kodak www.epicentre.co.uk; some useful advice on adjusting your monitor.

Pantone www.pantone.com



Croft original

How was the feisty, gun-toting heroine, Lara Croft, created? Could the amateur graphics dabbler achieve much the same effects? Benjamin Woolley enters the world of digital actors.

Lara Croft, the high-kicking lead in Eidos' *Tomb Raider II*, is extraordinary. She has shown that computer graphics have matured to a sufficient extent to allow the creation of, how can I put it?... fully rounded characters. She is a virtual Wonder Woman; as big a star as any hand-drawn DC Comic character. She has her own website and webzine at tombraider.gamestats.com/lara_croft.htm, her own representative on earth (Rhona Mitra) and her own imitators (no game now seems complete without a girl-power female lead).

Those of us who have enjoyed either version of *Tomb Raider* may think that creating such a star is beyond the resources of the humble 3D amateur enthusiast. The story of Lara's creation suggests otherwise. She did not, initially, arise out of the resources of some huge production facility boasting the latest and most expensive technology. She was born out of a simple cube, modelled using 3D Studio Release 4 (the last DOS version of the old warhorse). That, according to game-developer lore, is how Toby Gard, a CG artist then working for the games development company, Core, began to sculpt, polygon by polygon, the shape that is now familiar throughout the world.

Lara's theme

In a way this simple, if laborious, process of building up a model for a character helped ensure Lara's success. It meant the polygon count was kept to an absolute minimum: reportedly, the low-res version used in the game has only 500 polygons. (To give you an idea of how frugal that is, a standard low-res model of a woman from a digital model library such as Viewpoint

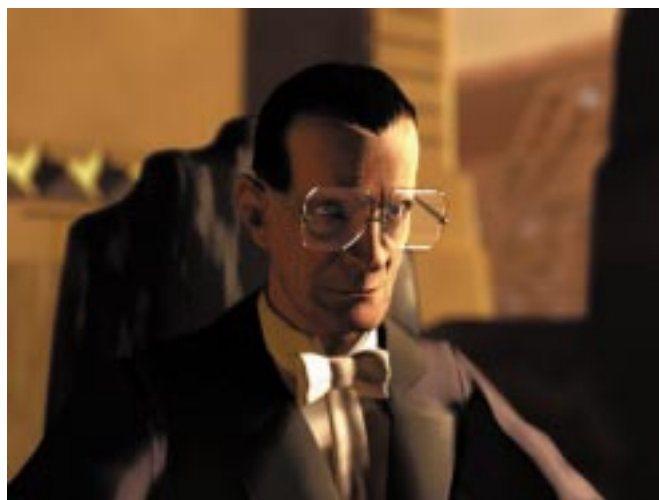


Fig 1 Real or replicant? A digital character from the *Blade Runner* game

used to create them was in some respects quite basic, although a little more involved than Toby Gard's. The Westwood artists took photographs, from eight different angles, of each

Datalabs would have at least five times that many.) This in turn meant that she could be rendered in real time, moving around at 30fps (as opposed to 15fps, the rate at which animations are rendered in other interactive games), producing the smooth, lifelike, graceful movement that is such a feature of her presence in the game.

Digital actors

Another game to have made successful use of virtual characters (over one hundred of them) is *Blade Runner* (Fig 1), developed by Westwood Studios. The *Blade Runner* characters are far more detailed than Lara, averaging 30,000 polygons each, according to the US computer graphics trade magazine *Computer Graphics World*.

The results are stunningly realistic human/replicant characters, surely among the best in the business, especially when you bear in mind that some are made up of as many as 20,000 polygons being rendered in real time.

Despite this sophistication, the method

actor who was to appear in the game and placed scanned versions of these as a background image in the modelling window of their 3D authoring software (3D Studio MAX). They then used the usual modelling tools to trace over the contours of the images, moving from, say, a front view to a profile and changing the angle of the viewport accordingly to work out the shape being traced.

Other 3D virtual characters ("digital actors", as they are now called) have had more elaborate conceptions. For example, a virtual Bruce Willis who stars in the Activision title, *Apocalypse*, was created by scanning in the real Willis using a 3D scanner. We have not yet seen the results (*Apocalypse* was still awaiting a release date at the time of writing) but it will be interesting to discover whether Mr Willis' star quality translates to the virtual world.

From a creative viewpoint, the problem with all the digital actors currently to be found in games is that each one has to be created from scratch and their behaviour



Fig 2 The Kiss: a sequence of images taken from the Motivate player

described in the most precise detail for each environment in which they appear.

In an attempt to overcome this problem and lay the foundations for the routine use of digital actors in online interactive games and other content, a company called The Motion Factory <www.motion-factory.com> has created a system called Motivate. This is a suite of tools which provides the basis for creating “intelligent” digital actors (perhaps *interactors*?) who can be used to populate all sorts of virtual environments and react dynamically to them.

Motivate has three main components:

1. A set of development tools for creating digital actors and an environment for them to inhabit.
2. A server for publishing content in which the actors appear, such as a multi-player game, over a network.
3. A runtime module or player to run the content on the client’s (i.e. player’s) PC.

Version One of the player, which you can download from the company’s web site, is nearly 3Mb and runs as a standalone application. Browser plug-in versions are on the way and may be available by the time you read this.

Setting the scene

Creating a proper digital actor using a system like Motivate is different from simply designing a model of a character like Lara, in one fundamental respect: you can put a digital actor in any number of different settings and it should be able to adapt to them. It will be able to walk around without bumping into things; it will “know” how to pick up objects, no matter what the object is (it may even know when the object is too big or heavy to pick up); it will know how to interact with another digital actor and even how to kiss — see the sequence in Fig 2. With Motivate, this is achieved by using the development toolkit in a three-stage process.



Take it to the max

Glyn Williams, from Particle Systems, is unhappy with what appears to be my favouritism for 3D Studio MAX at the expense of LightWave. I agree that Studio MAX is mentioned more frequently, despite LightWave having a far better pedigree, at least when it comes to 3D graphics for TV and movie productions. The reason for this anomaly is that I know and use MAX but have little more than a passing knowledge of LightWave. Ignorance is no defence, but I have tried to be as general as possible when writing about 3D graphics in the hope that my advice can be applied to all types of package. This is hard, but not impossible, since all use the same basic principles. *Screenshot above* Glyn created this image for the intro movie to the game *I-War*, showing just what LightWave can do

The first stage involves creating the cast of actors you are going to use, which is done by importing their geometry, textures and hierarchies from whatever modelling software has been used to create them. For more on modelling characters, hierarchies and inverse kinematics (crucial concepts in character animation) see my October and November 1997 columns.

Stage two involves giving these actors “skills”, like teaching them how to walk. Although the methods used to achieve this are similar to the standard ones of keyframe animation, the aim is different: in the case of walking, for example, it is not to animate the movement of the character from point A to point B in a particular environment; it is to teach it how to walk so that it can do so in any environment, so that it can follow the contours of the ground, negotiate steps, make turns and so on.

Stage three is called “behaviour creation” and is possibly the most important

to Motivate’s success. A behaviour is really a script, written using a Java-like language called Piccolo, which will run in the actor’s “digital brain”. It tells the character how to deploy its skills and what to do in different circumstances.

The Motion Factory has published samples to show off Motivate technology, and they are pretty convincing. The problem, as always, will be getting sufficient development muscle behind a proprietary technology to make it really useful: persuading artists and animators to produce the sophisticated skill sets and behaviour scripts needed to turn digital actors into persuasive characters.

PCW Contact

Benjamin Woolley can be contacted by post c/o PCW at the usual address (p10) or via email at 3dgraphics@pcw.co.uk



Lofty conversions

Conversion tools often sound better than they actually are. AppletDesigner, one such tool, claims to convert your VB project into Java applications. Tim Anderson puts it to the test.

Would you like your Visual Basic application to run anywhere? AppletDesigner from TVObjects claims to convert your VB 4.0 or 5.0 project to a Java applet or application. If you're like

is too good to miss though, so I installed AppletDesigner and tried it with Visual Basic 5.0. It installs itself as a VB add-in, along with its own copy of Sun's Java Development Kit 1.1, the Rogue Wave

JWidgets components, and Asymetrix JADO which implements Microsoft's Active Data Objects interface in Java. When installed, an AppletDesigner toolbar appears in Visual Basic. Not wanting to be over-ambitious, I opened the sample Calculator application that has come with every version of Visual Basic I have seen, and then clicked Make Java Applet.

This application declares some variables as variants, which Java cannot cope with, so AppletDesigner asked me to specify a type for each variant. Next, it told me the file was built successfully, so I clicked Run Java Applet. An applet with a start button appeared and, when clicked, a Java calculator appeared, looking impressively like the VB original. Impressed, I tried to use it, but sadly, clicking the buttons had no effect other than eventually to crash AppletViewer. Opening the generated Java code revealed why: various sections of code were commented out with error messages, so it had no chance of running. I made some hasty edits, and used the batch

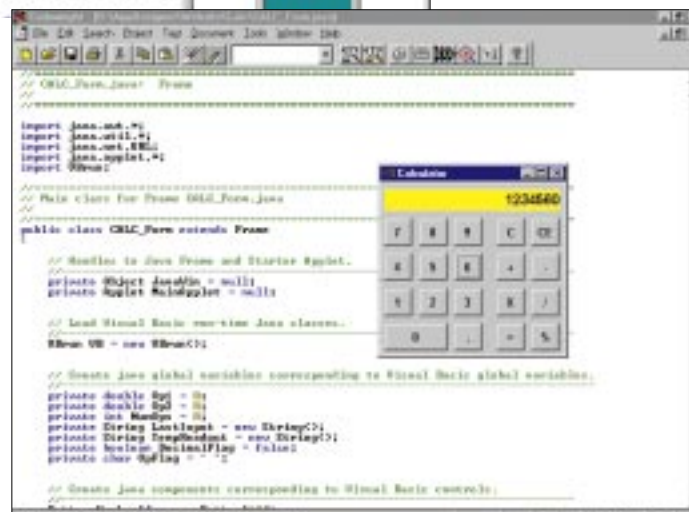


The AppletDesigner wizard kicks off with a series of dialogs identifying problem variables

Working at last: the Java calculator along with some of the generated code

me, you'll have tried conversion tools like this before and come away disappointed. As a breed, they sound too good to be true and generally are. Typically, they either do not work at all, or, if they do, the resulting code is so twisted by the conversion routines that it becomes impossible to maintain.

The prospect of instant Java applications



file conveniently generated by AppletDesigner to recompile. After that it more or less worked, although for some reason all the numbers I entered were ten times larger than they should have been. Easy to fix, no doubt, but also showing the high potential for bugs in a

conversion like this. The main problem areas in this simple example were type conversions along with classic gotchas like differences between VB's Select Case and Java's switch statement.

Next I tried a database application based on an Access MDB. Unfortunately, AppletDesigner failed during its analysis stage, the only way out being to close down Visual Basic from NT's task manager. Further investigation showed this to be the wrong approach. The key is in the extensive Readme document, which spells out what is and is not supported. To have any chance of database success, you need to use a specified subset of Data Access Objects with an ODBC data source. Many other tips show how to write VB code that will convert successfully; in other words, to use this tool you need to spend some time tweaking your VB project to suit AppletDesigner, and then run the converter.

Given the magnitude of the task, AppletDesigner deserves credit for working as well as it does and could save a lot of time converting VB procedures. The nagging doubt is that you are probably better off redesigning your application from scratch, to gain the benefits of Java's object-orientation and to structure the code as you really want it.

Understanding types in VB and Delphi

It may not be obvious when you first start programming, but all variables in a programming language have a type. The type determines what kind of data the variable can hold: for example, in Visual Basic an integer type can store a number between -32,768 and 32,767. The limits look odd, until you realise that this range exactly fits into two bytes of memory.

Computers are binary devices, and a byte is composed of eight bits, each of which can be one or zero. That gives you 256 values, or a number between 0 and 255. Two bytes give you that amount squared, which is 65536, or a number in the range offered by a Visual Basic integer. Some languages also give you the option of an unsigned integer, which gives a number between 0 and 65535.

By default, Visual Basic does its best to hide the business of types. For example, this code runs fine:

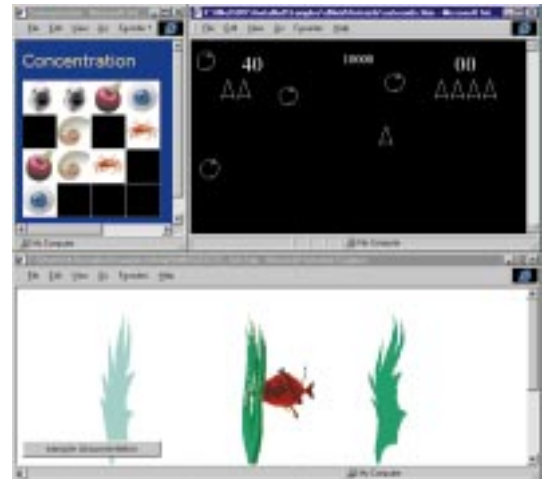
```
Sub Command1_Click ()
  ' horrible code
  myvar = 1
  yourvar = "4"
```

Book reviews

Inside Dynamic HTML

Scott Isaacs

This is a semi-official guide to Dynamic HTML in Internet Explorer 4.0. There are four sections. The first introduces Dynamic HTML and scripting. Next comes a section on document structure and scripting document objects. The third part is about cascading style sheets and animation, while the fourth section covers changing the contents of a document programmatically and binding objects to a database. The accompanying CD includes lots of code samples and Microsoft's Internet Client Software Development Kit,



And you thought it was gone for ever. The classic Asteroids game, implemented entirely in Dynamic HTML

although much of the material is also available on Microsoft's web site. The author is apparently Microsoft's representative to the World Wide Web consortium which controls the HTML standard, so has good credentials. The book is an excellent programmer's guide, although rather a dry read. The examples include the classic Asteroids game implemented entirely in Dynamic HTML. Recommended for developers wanting to build IE 4.0 applications, although sadly, compatibility issues currently limit its value for internet sites.

Teach Yourself JBuilder in 21 Days

Michelle Manning

The documentation supplied with Borland's RAD Java tool is skimpy, unless you buy the very expensive client-server version, so there is plenty of scope for third-party books. This one aims to teach you both Java and JBuilder in a 21-day course, complete with a quiz and exercise at the end of each chapter. It is a hard task and the book is too ambitious. Although it is fair as a general introduction to Java, as a guide to JBuilder itself it is insufficiently detailed; the database material is very thin. Since general Java tutorials are widely available, it would be better to assume more Java knowledge and focus more tightly on JBuilder's talents and quirks. That said, if you are looking for a Java tutorial with a JBuilder perspective, this may be just the thing. As a real-world guide to JBuilder though, it does not quite hit the mark.

Fig 1 Delphi is much more strict about code than VB

```
procedure TForm1.Button1Click(Sender: TObject);
var
  a: integer;
  b: single;
  c: integer;
begin
  a:= 1;
  b := 4.25;
  c := A + B;
  showmessage(inttostr(c));
end;
```

```
hervar = myvar + yourvar
MsgBox hervar
End Sub
```

It takes an integer and a string, adds them together to make another integer, and then displays the result using the MsgBox command, which should by rights take a string expression rather than a number. The

reason it runs is that VB does a lot of work under the surface. The variables are automatically declared as variants, which can store any data type, and VB converts them on the fly so you can do strange operations like summing a number and a string representation of a number.

Although it seems easier, Visual Basic is

Questions & Answers

Q This is something that struck me as strange while writing an Excel 7.0 macro. The idea was to have a simple “find” macro function that could take the name of a sheet, the column number and a string to find, and return some information on the same line row. The function is called `better_lookup` and includes the code in Fig 2 (p300).

What I am trying to do is write a function to return a string so that I can have a formula in a cell that says `=better_lookup("Sheet1", 1, "Martin", 1)`

But when this is called as a user-defined function in a sheet cell, it returns an error. Why, if the function is called from another macro, does it actually find what it should!

Please can you explain why this works in one context but not in another?

Martin Norris

A This is a strange problem. It arises because of restrictions on user-defined worksheet functions. The Excel programmer's guide explains that a user-defined worksheet function must not change any data in a workbook or change the Microsoft Excel environment in ways such as the following:

- Inserting, deleting, or formatting cells.
- Changing cell values.

■ Moving, renaming, deleting or adding sheets.

■ Changing the calculation mode or screen view.

The odd thing is that Martin's code does none of these things, but somehow falls foul of the restrictions. The important point, though, is that VBA used in a worksheet function may not work the same way as it does when called as a macro. To solve the specific problem, you could use a real worksheet function such as `Match` (Fig 3, p300).

Note the use of `ISERROR` to avoid Excel returning `#NA` from the function. Alternatively, it appears that the following construct works in this context:

```
better_lookup = "Not found"
For Each c In lookup_range
  If c.Value = "Martin" Then
    better_lookup = "Found"
  Exit For
End If
Next
```

The problem here is that if the range is a whole column and does not contain a match, it will iterate through all 65,536 rows, which is slow. There are plenty of ways you could stop the loop once it is past the active area of the sheet, perhaps using some special characters as an end-of-column marker.

Q I have written a program using Delphi 1 for which I wish to use a home-design font. I want to avoid having the user load the special font into Windows independently. Is there a way of embedding the font in the EXE file? There would be no requirement for the user to access the font for other applications; in fact, it would be very unwise to do so as it lacks lowercase letters.

Colin Carter

A Windows allows for embedded fonts, but these are intended for embedding in a document rather than an application. Only TrueType fonts are supported. The idea is to make it possible to distribute documents that use specific fonts, without breaching the licence for a copyright font and without cluttering the user's system with unwanted fonts.

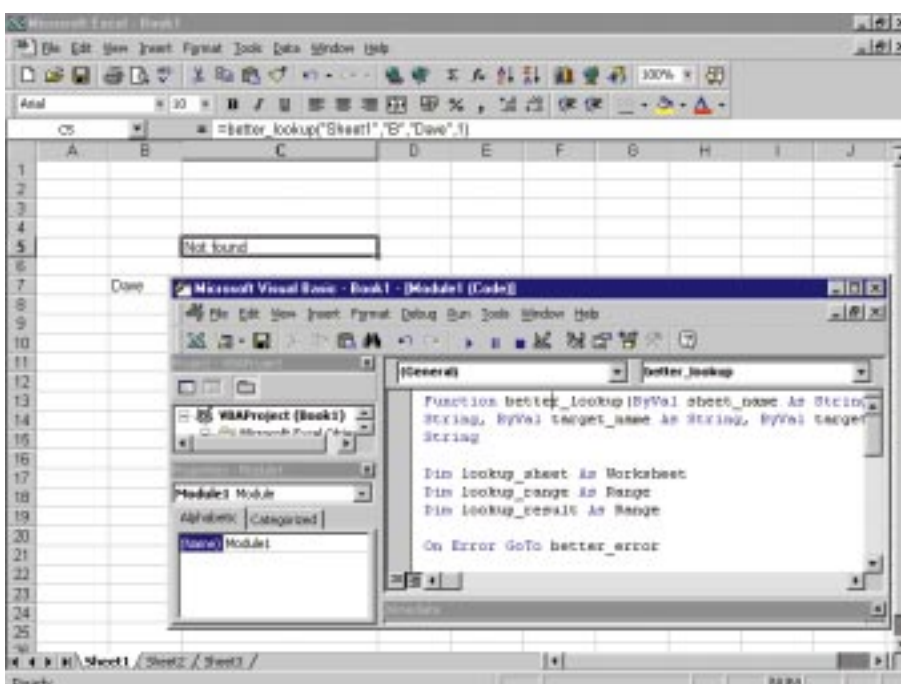
The mechanism for using embedded fonts is rather simple. The starting point is to read the font into a document using the API function, `GetFontData`. When the user opens the document, your application should write the font to a file.

Next, call the API function, `CreateScaleableFontResource`, which creates a resource file that enables Windows to use the font. This function has a parameter that lets you hide the font

from other applications if you wish.

Now you can install the font by calling `AddFontResource`, and use it in your application. To clean up, call `RemoveFontResource` and then delete the files you created. Full details are in any Windows API reference, for example the API help supplied with Delphi or the Microsoft Developer Network CD.

What this means is that embedded fonts work in exactly the same way as non-embedded fonts, except that the application installs them on-the-fly and removes them afterwards. Hiding their presence from other applications is a way of respecting the licence for a non-installable font. There is bound to be a performance hit, and a better option would be to install the font permanently in your setup routine, assuming you have an appropriate licence. ➤



Mysteries of Excel: why does VBA not always work in worksheet functions?

Fig 2 Code included in the better-lookup function

```
Dim lookup_sheet As Worksheet
Dim lookup_range As Range
Dim lookup_result As Range
Set lookup_sheet = ThisWorkbook.Worksheets(sheet_name)
Set lookup_range = lookup_sheet.Columns(column_name)
Set lookup_result = lookup_range.Find(target_name)
If lookup_result Is Nothing Then
    better_lookup = "Not found"
Else
    better_lookup = "Found"
End If
```

Fig 3 Match, a real worksheet function

```
=IF(ISERROR(MATCH("Martin",B:B,0)),"Not Found","Found")
```

not doing you any favours by running this kind of code. There are several reasons. First, it is error-prone. If you get one letter wrong when typing a variable name, the chances are that VB will still run the code, but with incorrect results. Languages like dBase and FoxPro have exactly the same problem. Second, it is inefficient. Variants take more room in memory than other data types, and because Visual Basic has to do extra conversion work at runtime your applications run more slowly. Third, it makes applications hard to maintain, because it is more difficult to keep track of each variable and what it is for. Fourth, automatic conversions like those in the example are dangerous, since you may not be sure what the outcome will be. If you add a number to a string, should this result in an error? Or should the string be

converted to zero? Or should the compiler do an implicit val() on the string to see if there is a number represented there? Visual Basic does the last of these, but you may not realise that. It is quite likely to hide a bug in your code.

Visual Basic does provide a partial solution. By placing the statement Option Explicit at the top of a form or code module, you ask Visual Basic to require all variables to be declared. It is still up to you to ensure that data types are specified. If you just enter "Dim myvar", then VB declares a variant, with the same problems already identified. Option Explicit is still worthwhile, and you should check the Require Variable Declaration in VB's Environment options (Tools options in VB 5.0) to enforce it automatically.

Delphi is stricter all round. All variables

must be declared, and there is no default type. This is good, as you are forced to think about what type to use for each variable. Delphi is also more particular about type compatibility. In VB try this code:

```
Sub Command1_Click ()
Dim a As Integer
Dim b As Single
Dim c As Integer
a = 2
b = 4.25
c = a + b
MsgBox Str(c)
End Sub
```

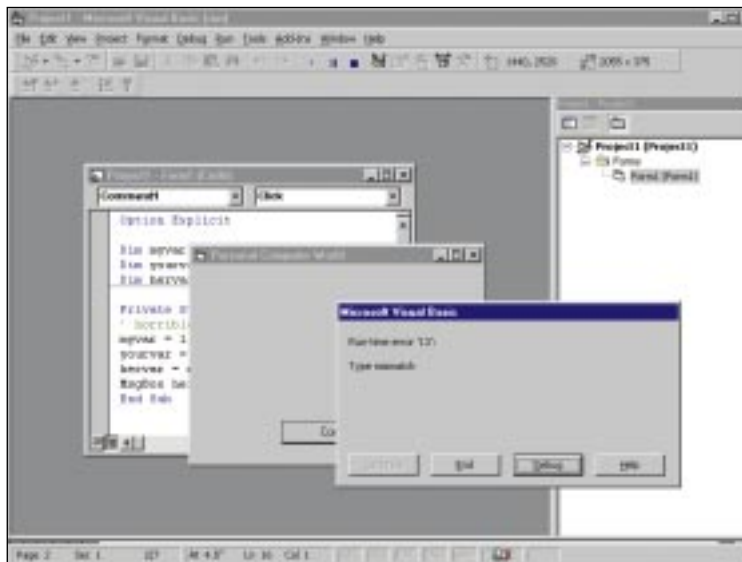
It runs without error, but the floating point part of the summed number has been silently forgotten. By contrast, try Fig 1 (p297) in Delphi. Delphi will not compile this, but reports an incompatible type error. To correct it, either declare variable c as a single, and replace intostr() with floattostr(), or use the Trunc function to explicitly remove the floating point part of variable b. In some cases, this kind of error can also be solved by a typecast, which asks the compiler to treat a variable of one type as if it were another type.

Look this up in Delphi's online help for more details.

Top type tips

- In Visual Basic, use Option Explicit.
- Only use variants when you have to.
- Look up and learn all the data types offered by your compiler. Each version of Visual Basic and Delphi is different.
- For speed and efficiency, use the smallest type that is sufficient for the task.
- Floating-point types are slow. Use integer types where possible.
- Take advantage of user-defined types to simplify your code and make it more readable.
- In Delphi 1.0, declare string types with a maximum size to save memory.

An annoying error, but dialogs like these save you from damaging bugs. Visual Basic is too tolerant



PCW Contacts

Tim Anderson welcomes your Visual Programming tips and queries. He can be contacted at the usual PCW address (p10) or at visual@pcw.vnu.co.uk. **AppletDesigner** costs £89 for the Standard version. Enterprise version also available. From **Soft Export** 0800 973098 www.softexport.com

Inside Dynamic HTML by Scott Isaacs (Microsoft Press) £37.49 inc VAT (book and CD). *Teach Yourself JBuilder in 21 Days* by Michelle Manning (SAMS, £36.50 inc VAT (book and CD)). Both from **Computer Manuals** 0121 706 6000.



Travelling light

What's difficult about networking on the road? People want all the benefits of a notebook without having to lug the thing around with them. Bob Walder looks at the options available.

I am a firm believer that networking is more about connecting people to people, and people to information, than it is about hardware and software. Group scheduling on the network is all well and good but there is nothing more frustrating when you are away from the office than finding you cannot check your diary when you need to make a new appointment. Furthermore, if that new appointment is with a prospective client, you are also running the risk of appearing somewhat unprofessional.

Email is another important resource that we miss when we are out on the road. I don't know about you, but I will always use email in preference to a telephone call for general communication, since it allows you to be concise and to the point, and you don't get side-tracked into irrelevant conversations.

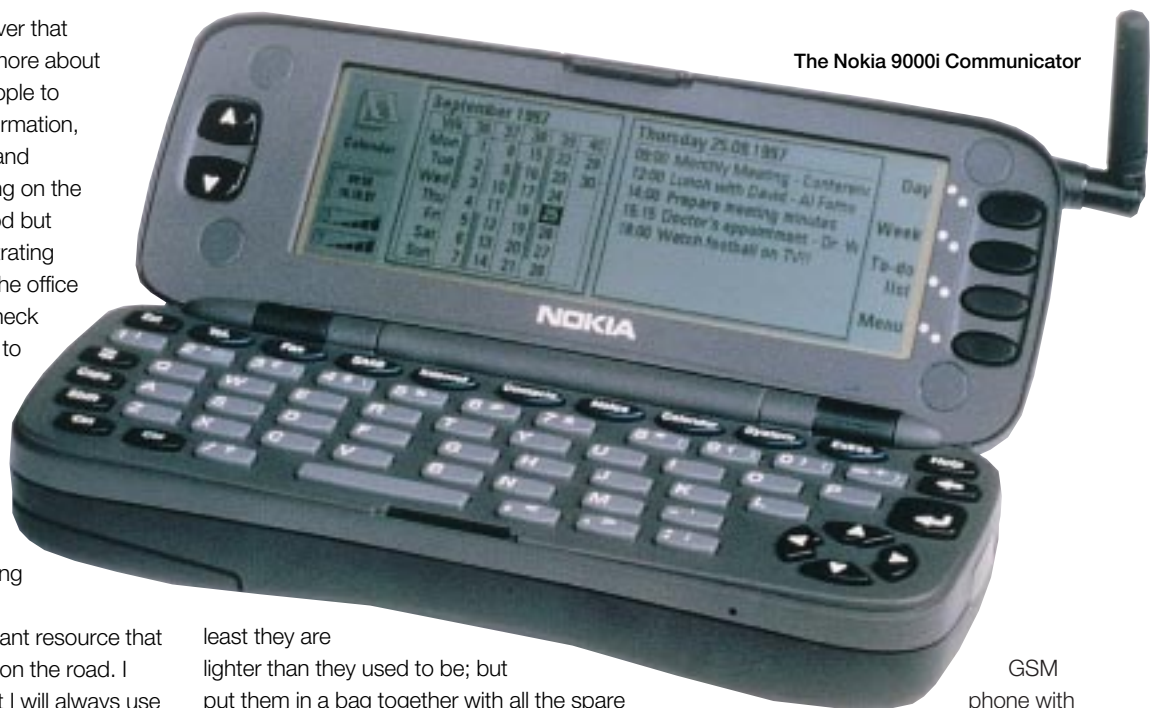
If you are on a long train journey or stuck at the airport, that is the perfect time to catch up on your email (and it is far less annoying to your fellow travellers than making numerous calls on your cellular phone). Naturally, there are ways around this. The most obvious is to take your laptop with you: if it is synchronised before you leave the office, you then have all your email, diary, task lists and probably most of your current working documents, too. But there is a price to pay for this level of convenience, and that is the major *inconvenience* of having to lug around one of the current crop of notebooks. OK, at

least they are lighter than they used to be; but put them in a bag together with all the spare batteries you are going to need to keep you going for anything more than a quick train journey, and they are still heavy enough to put your shoulder out.

Nokia cellular card phone

Mind you, at least the communications side of things is looking up. No longer do you have to hunt around for a spare phone socket in which to plug your modem cable (not much chance of that on a moving train!), since with a cellular data card you can connect your laptop to your mobile phone via the PC Card slot.

For a long time now, I have been asking: "Why can't we have a PCMCIA cellular data card with the GSM phone built in?" This makes perfect sense to me, since I could use my laptop to pick up email and browse the web without having to connect up my



The Nokia 9000i Communicator

GSM phone with a trailing cable.

Nokia obviously thinks it is a good idea too. The result is the Cellular Card Phone, a standard PC Card with built-in GSM phone. The antenna is integrated with the card so all you need do is to plug your phone's SIM into the card, plug the card into a spare Type II or III slot and install the software. You can then send data, fax or SMS messages over GSM networks, browse the web, pick up your email, perform file transfers and so on. The neat feature is that it includes speech capability too, so provided you don't mind making your calls in a "hands free" mode, you don't even need a separate GSM phone.

Windows CE 2.0

I gave up carting my laptop around quite some time ago. I now only take it with me

Hub of the matter: upgrading to a faster network

QI am currently working as a volunteer at a school in Lebanon and the school has asked me to upgrade their computer room. At the moment they have 486 machines without hard disks running on a network which is connected by BNC coax cable to a NetWare server. The network is very slow. The machines run Windows 3.11 and boot into Windows from a floppy disk.

One of the things I would like to do is replace the NetWare server with a Windows NT 4.0 server because I know more about these than I do about NetWare — not difficult, as I know nothing about NetWare!

Is it possible to boot from a machine without a hard disk (but with a floppy disk drive) into Windows 3.11 (or even Windows 95) when the machine is connected to a Windows NT 4.0 server?

I have been told that it would be possible and considerably faster to run the network around a hub and install network cards in those machines that are able to support an Ethernet 10Base-T system. Do you think this is true?

Chris Smith

A It is hard to comment on exactly what might be causing your network performance problems, but here are some quick pointers which may help set you on the right track.

You don't say how many users there are, but the network could be slow for any number of reasons:

- Poor network cards.
- Wrong drivers for the cards.
- 486 processor machines running Windows (most likely explanation, to be honest. You need a minimum of 8Mb of RAM in each machine).
- Diskless workstations running Windows

puts a strain on the network

Also, think long and hard about the proposed change from NetWare to NT. I know you say there are other reasons for the change, but it would be unwise to upgrade from NetWare to NT just for the sake of it. You may be better upgrading to NetWare 4.11 instead, for the following reasons:

- NetWare is generally faster as a file and print server.
- You may not know much about NetWare, but it is easy to learn enough to manage a small network.
- You may think NT is friendly because it looks like Windows, but NT is about as friendly as a cornered rat when it comes to everyday network management tasks. I have never had to rebuild a NetWare server from scratch (losing all data and everything) because of something going wrong with the configuration, but this has happened to me with NT 4.
- Only upgrade to NT if you intend to use it as a platform for other applications such as a fax server, or SQL Server or Exchange.

As for the 10Base-T hub upgrade, forget about it — you would have to re-cable everything and would still only be running at 10Mbps. Once again, it is only worth upgrading to 10Base-T if you are going to improve other parts of your network, i.e. install a switch instead of a hub.

One thing worth checking is the condition of your existing cabling. Stick a network analyser on there and watch for errors, bad packets, etc. If there are problems, it could be causing lots of network errors and that could slow down your network. If you check your cable and decide a significant part of it requires replacement, *then* you could look at moving to 10Base-T, since you will be doing some major re-cabling anyway.

when I know I am going to need it for some specific task, like plugging straight into the Barco projector to give the PowerPoint presentation I have just prepared. It also allows me to use the same email and scheduler client (in my case, Microsoft Outlook) as I do when I am in the office. The bulk of the thing is still unwelcome, and for this reason I am eagerly awaiting the arrival

of the new crop of Windows CE 2.0 machines due out shortly. These will give me pocket versions of all the applications I use at the office, even PowerPoint, with some neat Hot Sync software which ensures the latest data is always on the palmtop machine. And with the HP machine boasting an external SVGA port, I can still plug it straight into the Barco projector to

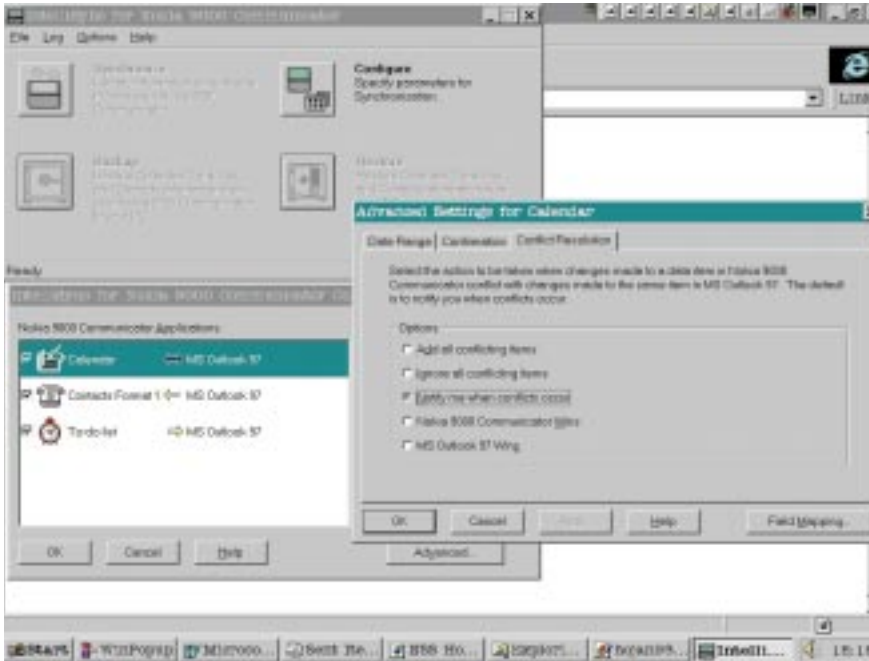


Fig 1 Using Intellisync to synchronise between MS Outlook 97 and Nokia Communicator 9000i

give my presentation. Likewise, the built-in PC Card slot gives me the option to make use of cellular communications, even if it does drain the batteries quickly.

Psion Series 5

At the time of writing, the CE 2.0 machines remain on the horizon, so I am still using my trusty Series 5 from Psion. In my opinion, Psion has been the world leader when it comes to PDAs (Personal Digital Assistants) ever since it launched the 3a. The Series 5 offers an excellent keyboard, backlit touch-sensitive screen, incredible battery life, and a range of top-quality applications including internet mail and WWW browser.

Two things let it down: the terrible PC synchronisation software that comes with it (not a patch on the new Microsoft Hot Sync stuff) and the fact that it does not have a PC Card slot. If I want to use my cellular phone to pick up email while on the move I have to connect the external PCMCIA adapter, plug in my Nokia Cellular Data Card and attach this to my Nokia 2110 phone. The result, while still fairly light and relatively mobile, is clumsy to say the least, with three boxes strung together with two cables.

Nokia 9000i Communicator

Recently I came across what, for me, is the ultimate in portable communications. The Nokia 9000i Communicator is the latest release of the product: it includes some revamped software and the price has been brought down to £249 (or less). For this

price you get a single unit that looks like a slightly oversized GSM phone, with the keypad and LCD panel on the front and the microphone and earpiece at the back. The "phone", however, opens to reveal a full QWERTY keypad with some scroll keys and several special application keys.

In the lid is a clear 640 x 200 greyscale LCD screen (reminiscent of the Psion 3a) with a few special function keys. The phone can even be used in "hands free speakerphone" mode when the case is open, allowing you to conduct a call while running any of the built-in applications.

The 9000i has an Intel 386 processor with 8Mb memory: 4Mb for the Geos 3.0 operating system and 2Mb for program execution, which leaves 2Mb for user data storage. This might not sound like much, but you can actually fit quite a bit in there: I have almost 700 records in my contacts database, a few documents, a fax or two, a couple of emails, and all next year's appointments — and I still have 1.5Mb free.

The contacts database has an excellent search facility and is tightly integrated with the remaining applications and with the cellular phone, so when you search for numbers using the Find function on the phone's keypad, you are actually searching your Contacts records.

All my appointments and contacts are kept synchronised with Microsoft Outlook on my PC via the optional Intellisync software (Fig 1).

One of the features of all SMS phones

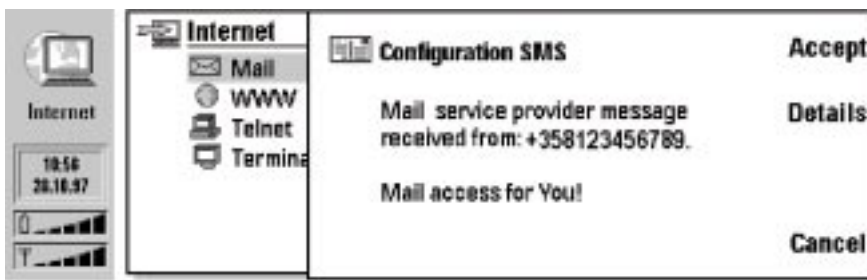


Fig 2 (top) Smart SMS messages can even be used to configure your Nokia 9000i

Fig 3 (above) Viewing email configuration details received via SMS

which has long been neglected is the Short Message Service (SMS). The main reason for the lack of enthusiastic uptake is the lack of a full keyboard on normal phones coupled with the short (160-character) maximum length. The Communicator gets around both of these, given that it has both a full keyboard and the ability to seamlessly chain a number of SMS messages together to provide a far more usable maximum length of 2,280 characters.

Short and sweet

You can also use the Short Message Service to send electronic business cards, either your own or any contact information in your Contacts directory. When someone sends you an electronic business card, accept it, and the 9000i creates a new item in your contacts directory.

Smart Messaging via the built-in Text Web application gives you access to any information available on the internet such as news, sports, stock quotes or traffic reports — new services are being introduced all the time. Special “smart SMS” messages can even be used to configure your Communicator automatically (Figs 2 & 3), thus allowing an administrator to configure all Communicators for all employees remotely.

The Calendar is the product’s weakest application when compared with the likes of Psion, but it is adequate and even allows you to send and receive requests for meetings to other 9000i users via SMS. The Notepad, too, is fairly basic but once your

documents are complete, a couple of keypresses are all that is required to send them via SMS, fax or email, or they can be printed out via an infra-red link or transferred to your PC via the serial interface (or infra-red). With a data-enabled SIM you get a separate fax number to your normal mobile phone number and you can thus use the Communicator as a true mobile office, sending and receiving faxes even while using other applications. Once a fax has been received it can be viewed, zoomed, rotated, printed out or forwarded on to another fax machine.

Finally, the internet application provides email, WWW browser, Telnet and Terminal functions. You can have any number of ISPs and configuration is a cinch. If your ISP offers IMAP support, you can connect to your remote mailbox and choose which messages you want to download to the 9000i: the rest can be left on the server or deleted. POP3 is also supported, as are mail attachments, which can either be viewed locally or transferred to a PC.

All together now

All the applications work together, with no cables, no adapters, no hassles. Receive a message by email and forward it by fax. Send a fax and then call to discuss it hands-free while reading it on the screen. Send a message to several recipients, by fax, by email, and by Short Message Service (SMS). Connect to a printer or a notebook PC using the built-in infra-red link or serial cable. With the phone turned off, in

an aeroplane or in a meeting, write email messages and send them all at once when you turn the phone back on.

Other applications include system and security configuration, wireless data backup, Calculator, Alarm clock with world time, composer (to create your own musical ringing tones — mine now plays the Star Wars theme when you call me!), currency and measurement converter, and help system.

Finally, if you really must take your laptop with you, you can connect the Communicator to the serial port and use it as a standard external fax/data modem.

And the winner is...

All in all, the Nokia 9000i has replaced the Psion Series 5 in my heart as my “go anywhere” piece of kit that does just about everything I could want, in a compact and convenient one-piece package.

Yes, there are a couple of shortcomings with the 9000i. The keyboard is not brilliant if you have lots of writing to do (not a patch on the Psion Series 5, for instance) and there is no backlight, but both of these can be forgiven, considering the size of the package and the battery life you get from it: 2.5-3.5 hours constant phone/fax time, 28-33 hours standby, and somewhere in-between when using the PDA functions only. More serious, however, is the basic Calendar application. Oh, and the complete lack of credibility when using it just as a cellular phone! If people around you do not realise it is a Nokia Communicator and thus the coolest piece of communications equipment on the market today, then they will think it is just a clunky, obsolete analogue phone that you got free in a packet of cornflakes. It is a bit on the big side, you see, if it were just a mobile phone.

Should that happen, of course, you could always flip open the case, go hands free and start consulting your contacts database, taking notes while talking. You can then finish off by saying that you will fax or email the details over as soon as you hang up, and proceed to do just that from the same piece of kit. Now that should raise a few eyebrows... Credibility restored!

PCW Contacts

Bob Walder can be contacted via the PCW office (p10) or email networks@pcw.vnu.co.uk

After the lights go out

Don't rely on being able to restart your PC after a crash: the day your system crashes may come all too quickly, so you should take precautions now. Lynley Oram shows you what to do.

Imagine it's a dark night. The moon is full, and far off in the distance a dog howls. You start up your computer and... nothing. That piece of beta software, or a virus that slipped through despite all your precautions, has trashed your hard drive. All your data is now incomprehensible gobbledegook. Or it would be if you could read any of it, which you can't because your PC now refuses to start Windows 95.

This is the exact scenario, minus the howling dog, that I recently experienced. Luckily, the most important bits of data were retrieved by my company's third-party maintenance contractor. If you haven't backed up recently (or at all) then one of these experts will probably be your first port of call. Check your PC's warranty and insurance (if you have any) and check out your cover. But all this will not be a concern as long as you keep your system regularly backed up.

There was an upside to my horror story, though. My PC had to cope with two *PCW* scanner group tests, several different printers and a number of new add-in cards. In the process, a lot of unwanted legacy stuff was left behind to clog up my hard drive and slow my system down. Once my hard drive had been wiped clean and Windows 95 reloaded, the performance gain was staggering.

Be prepared

Don't wait for disaster to strike, be ready for it. Back up your files. Check that you've still got all the original drivers for devices like the graphics card and the sound card. Make sure you've still got the floppy disk labelled "Microsoft Windows 95 CD-ROM Set-up Boot Disk" that came with your PC. You should also have a Windows 95 CD-ROM complete with booklet and an OEM number.

Have you ever left a floppy disk in its drive by mistake and got the "non-system disk" error message the next time you switched the machine on? The reason for this is that your PC usually tries to boot (start the operating system) from the floppy drive before going to the hard disk. The

Set-up Boot floppy is the disk for which your system was looking. If there is nothing in either drive — because, in this scenario, your hard drive has been trashed — your PC will not boot.

Before you have to rely on your Boot disk, make sure that it actually works. Stick it in your floppy drive and restart your machine. If it works, then instead of the familiar Windows 95 desktop you'll get a screen with instructions to follow. If the boot disk doesn't work, you may simply get the A prompt (A:\>). When I tried to use my startup disk, I received a data error

because the floppy had become corrupted over time.

Don't despair if your boot disk fails or has gone missing. It is possible, under Windows 95, to make another.

DIY boot disk

To make your own boot disk, you will need to have a 3.5in floppy disk with at least 1.2Mb capacity at the ready.

1. Pop this into the floppy drive and go to the Control Panel, either by clicking on the My Computer icon or via Settings on your Start menu. Double-click on the Add/Remove Programs icon.
2. In the dialog box that opens there are three tabs. Click on the third tab, headed Start-up Disk, then click on the Create Disk button. You'll be prompted to "Insert the disk labelled Windows 95 CD-ROM" that should have come with your PC; if it didn't,

you are now in a little bit of trouble, as you can't reload Windows 95 without it. Chase your computer supplier for the original Windows 95 CD-ROM.

Some of the larger computer manufacturers are shipping new PCs with a CD-ROM that will not only reload Windows 95 but also load all the software and drivers with which your PC originally shipped. It may not look like a Microsoft product, as the manufacturer may have its own logo on the CD's sleeve, but it will do the job.

The question you may be asking is: if the CD-ROM has everything on it, why do I

```

C:\WINDOWS>
cd..
A:\>
dir /w

Volume in drive A has no label
Volume Serial Number is 242C-6281
Directory of A:\

DRVFACD.BIN      COMMAND.COM      FORMAT.COM       SYS.COM          HIMEM.SYS
FDISK.EXE       ATTRIB.EXE       EDIT.COM         REGEDIT.EXE     SCANDISK.EXE
SCANDISK.INI    DEBUG.EXE        CHKDEK.EXE      UNINITAL.EXE    CONFIG.SYS
SETUPDISK.SYS  COUNTRY.SYS     DISPLAY.SYS     EGA.CPI          EGA2.CPI
VGA.CPI         KEYS.COM         KEYBOARD.SYS    KEYBOARD2.SYS   MODEM.COM
SETUPDISK.EXE  DRVCPY.INI      AUTOEXEC.BAT

28 file(s)      1,176,241 bytes
 8 dir(s)       58,890 bytes free

A:\>

```

This is the directory on a boot disk that worked. It helps to know a few DOS commands, so restart your PC in MSDOS mode. You will find yourself at the C: prompt, in the Windows directory (C:\WINDOWS>). Typing `cd..` takes you to the C: prompt (usually referred to as returning to the root) which is where you need to be if you want to get to the floppy drive. Typing `A:` takes you to the A drive. To display a directory, use the `DIR` command. Typing `/w` causes the directory to fit the width of the page so that information doesn't scroll off the top

need a boot disk? Because under the current versions of Windows, your PC forgets that it has a CD-ROM drive. This means that your PC can't boot from the CD-ROM because it won't be able to find the drive. With the next version, Windows 98, you may be able to boot from the CD-ROM. But the software is still in beta, and Microsoft has not yet confirmed that this will be the case.

3. Once you've inserted the CD-ROM, Windows will begin preparing start-up disk files. This takes about five minutes. Here we hit another little Windows 95 idiosyncrasy:

although it will prepare a disk from which you can easily boot, it won't transfer the CD-ROM drivers onto the boot disk. This means that when you start up, you still won't be able to use the CD-ROM; because Windows 95 ships on CD-ROM, you can boot your PC but not install the operating system. This problem has been fixed in Windows 98, where you'll be able to make a start-up disk that automatically includes the CD-ROM drivers.

Not much consolation if you're using Windows 95, though. You will first need to copy the autoexec.bat file (a batch file) and the config.sys file onto your boot disk.

4. Right-click on your Start button and choose Explore to open Windows Explorer. Click once on the hard drive (usually C:) so that its contents are visible in the right-hand pane. Scroll down the right-hand pane until you find these two files. Copy them onto the boot disk by dragging and dropping them onto the A: drive.

5. Next you need to copy MSCDEX.EXE onto your floppy; this is a program which activates a CD-ROM drive under DOS. In Windows Explorer, click on the Windows folder on your hard drive, then click on the Command folder (you will find this program in here).

6. Finally, you need to copy your CD-ROM drivers. These are specific to your particular make of CD-ROM, although we've managed before to use drivers from different manufacturers without any problem. You may still have the original installation disk for these drivers, or you could download the real-mode CD-ROM driver from the manufacturer's web site. Otherwise, look for a .SYS file on your hard drive that pertains to your CD-ROM.

7. Right-click on the Start button and select Find. Look for all .SYS files by entering *.SYS. For the purposes of this example, we're going to call our CD-ROM driver GSCDROM.SYS. In the line of code below, replace GSCDROM.SYS with the name of your .SYS file.

For your boot disk to work, you need to have the following lines of code present. Have a look inside the config.sys file. There should be a line reading:

```
DEVICE=A:\GSCDROM.SYS /d:cdrom
```

And this line in the autoexec.sys file:

```
A:\mscdex.exe /d:cdrom
```

It may not specifically read "cdrom", as this is just a name. It could be anything; your manufacturer may have decided to name it "alfred", for instance. All that

To make a startup disk, click on the Add/Remove Programs icon in your Control Panel



matters is that the name is the same in both lines and that both lines appear in the appropriate files. If they are absent, you will need to put them in yourself.

The d refers to device and not drive letter. The first available drive letter will be assigned to the CD-ROM drive and since most PCs only have an A drive and a C drive, the CD-ROM drive is usually assigned the letter D.

Lastly, but most importantly, try out the boot disk to make sure that it works.

Making a Windows 3.x boot disk

Restart your machine in MSDOS mode. To copy all the necessary files onto the floppy disk, enter:

```
C:\>sys A:
```

This transfers the system files and turns your floppy into a boot disk. Still no CD-ROM drivers, though, so you need to copy your autoexec.bat and config.sys files onto the floppy as well, and this needs to be done in DOS as follows (these files must also contain the code outlined in the section above):

```
C:\>copy config.sys A:
```

```
C:\>copy autoexec.bat A:
```

Wiping your hard drive clean and reloading Windows

Well, I did prepare you for this eventuality, and it has finally happened. So, mop the sweat from your brow and roll up your sleeves. You now have to wipe your hard drive and start again.

1. At the command prompt (C:\>) enter:

```
C:\>format c: /s
```

This simple-looking command will wipe all the data off your hard drive but should still preserve your system files.

2. Next, you will get a warning prompt, explaining that all the data on drive C: will be lost, and do you really want to do this? Now is the time to back out if you want. Otherwise, enter Y.

A percentage counter will begin running, and when it hits 100 percent, formatting is complete. You'll be asked if you want a volume label; this isn't necessary, so don't worry about it and just hit Enter for now.

3. Restart your machine with the boot disk in the floppy drive and your Windows 95 CD-ROM inserted in its drive. Your boot disk should load the CD-ROM drivers and make it available as drive d. Now type:

```
D:\>setup
```

4. After this, follow the on-screen instructions. If your version of Windows 95 is an upgrade from Windows 3.1, then you will need to install Windows 3.1 first.

Drivers start here

The first time you start your machine after reloading Windows 95, you'll get the "Getting ready to start Windows first time" screen. One thing you may have to do here is install drivers, such as the graphics driver. One way to do this is to open the Control Panel and double-click on the Add New Hardware icon. When asked if you want Windows to search for your new hardware, click No. Double-click on Display Adapters and click on Have Disk. From here, you should follow the on-screen instructions.

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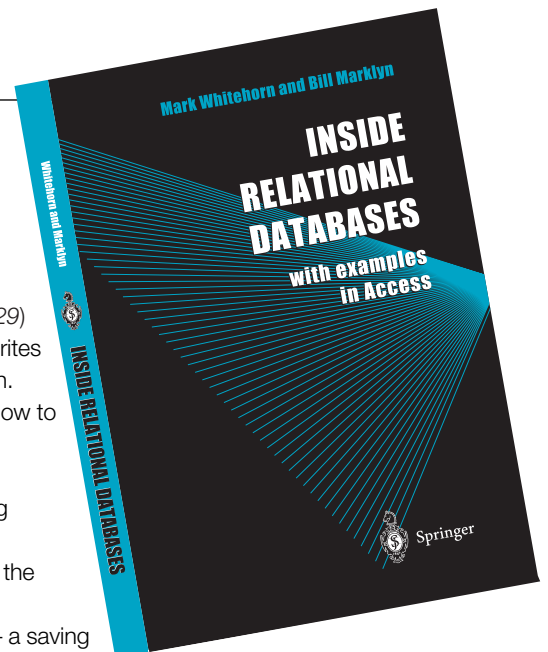
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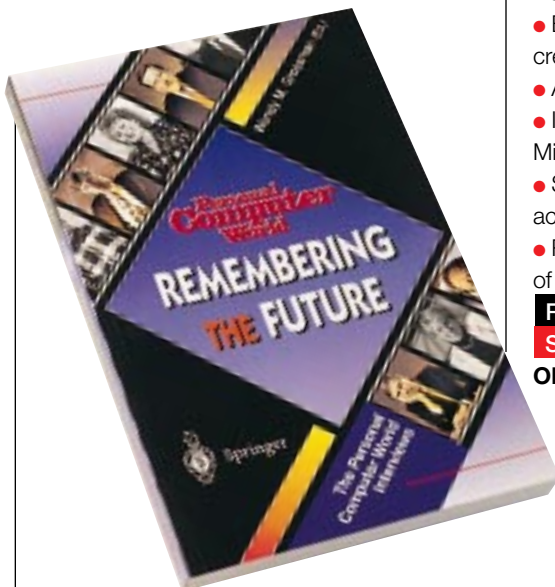
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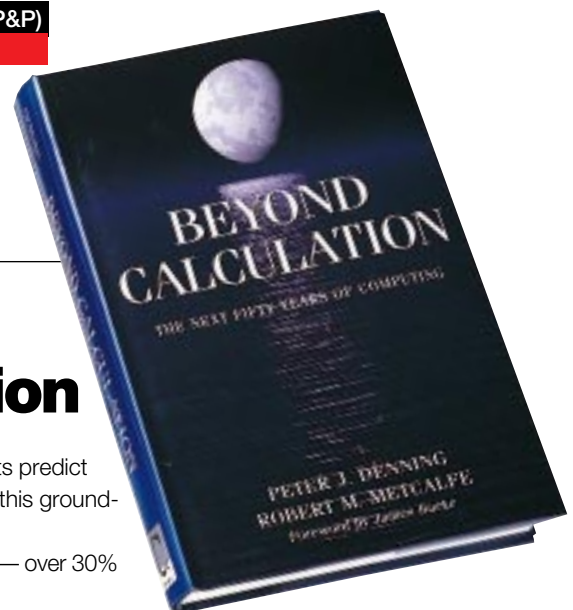
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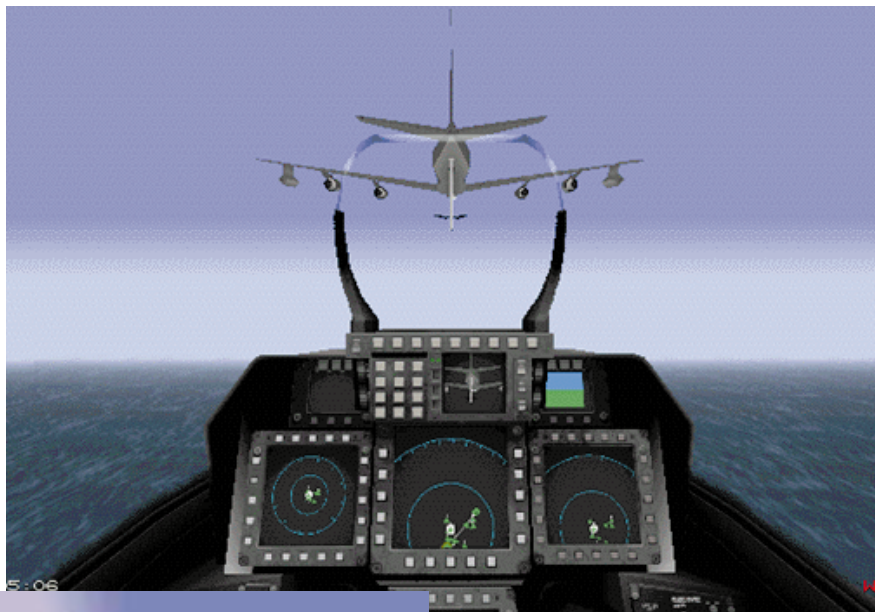
This is a far cry from the "cabbage crates over the briny" world of other flying games. In fact, calling it merely a game is an insult. This is a flight combat simulator based on the F22 Raptor, the advanced fighter plane due to come into service in 2004.

You start off outside the hangar and taxi to the end of the runway before take-off. I plunged straight in and crashed into the hangar twice before I decided to read, rather than glance at, the 176-page manual. And that rather sets the tone for the whole game: you'll have your work cut out flying the plane, let alone making time to shoot at anything.

I found it took so much effort to keep the plane on an even keel that I never really worked out what the head-up display was telling me, so I often missed the chance to target my missiles.

It's certainly realistic — for instance, the thrust from each engine is modelled, so if you turn one off you'll fly in circles — but this detracts from F22's playability. Likewise, the way in which missions are organised: they're heavily scripted and you have to fly along pre-marked routes to destroy particular targets. This is fine, but the target might be one tank in a group of ten — miss it, and you've failed your assignment even if you've turned the other nine into heaps of tangled metal. What's more, the weapons don't seem particularly realistic. Cluster bombs are designed specifically so you only need to get close to your target, yet in F22 you have to score *direct* hits on the target even though the explosives cause blast damage.

The missions themselves are interesting. There's a comprehensive training programme and you can launch straight into action. The real meat of the game, though,



Above In-flight refuelling is the only way to complete many missions

Left Another bandit gets splashed

Other features include in-flight re-fuelling (even the Quick mission is five hours long!) and the ability to oversee the entire battle from an AWACS plane. You can watch its progress, move fighters around to intercept enemy planes or destroy ground targets (at least, you can once you've memorised the three dozen radar symbols). Oh, and there are multi-player facilities too, so you can shoot at your friends across the office network or turn complete strangers into toast on the internet.

Overall, F22-ADF is very complicated. It's rewarding in its own way (I got a thrill just out of landing safely... well, alive even) but you'll have to put in a lot of effort. Don't even think of buying it if you just want to shoot people: it's not playable on that level.

John Sabine

is in the Tours of Duty. These take place around the Red Sea, in Eritrea and Saudi Arabia. In each case there's detailed political background (in two tours, you're flying UN missions) but this adds little to the game. It's good to see overall mission objectives which go beyond simple commie or Arab-bashing, but these are only cosmetic. Your missions nevertheless remain as simple as "find the baddies, then kill them".

It's a shame that DID hasn't put as much work into the graphics as it has into the rest of the game. To be fair, the visuals are optimised for the 3Dfx chipset and my PC, though powerful, has a different 3D card. Nonetheless, the ground looked pretty much the same and even features like buildings were lacking in detail despite all options being selected.

PCW Details

Price £34.99

Contact DID (distributed by Ocean)
0161 827 8000 www.did.com

System Requirements Win95, P133, 16Mb RAM, 70Mb hard disk space (20Mb for the installation + 50Mb free space), 2X CD-ROM, SB16 or Windows Sound compatible sound card.

★★★

Netstorm Islands at War

Preserve your priest-power by fighting the island factions.

This is another real-time action/strategy game designed to keep you glued to your monitor for hours. If you get bored playing it on your own, you can try taking on the world via the internet.

Netstorm transports you to the mythical world of Nimbus, a floating island in the sky. Here lives a High Priest who has the ability to harness the Storm Power, and this allows him to create buildings out of thin air. Nimbus would be a great place if it were not for the Nimbian factions on the next island who want to overrun yours and sacrifice your High Priest in order to become even more powerful. But if you happen to be a blood-thirsty megalomaniac (like myself) you can get your own back in turn by sacrificing *their* priest.



Each of you must build bridges with weird and fantastic weaponry in order to achieve dominance. I was slightly disappointed, though. For instance, when building the bridges you can only use those bridge parts which are randomly allotted to you, and this limits your freedom to design and carry out your offensive.

Nimbus: the floating island in the sky

I liked the idea of linking up with other players on the internet: it adds to the flavour of human genius and fallibility. I could easily get attached to my floating island — just as long as it survived the many battles.

This game has some good animation and is definitely for those whose heads are planted firmly in the clouds.

Michael Murphy

PCW Details

Price £29.99

Contact Activision 01895 456700

www.activision.com

System Requirements Win95, P90 or better, 16Mb RAM, 15Mb hard disk space, 256-colour VLB or PCI video card with 1Mb RAM.

★★★

Worms II



Mad Cow, Super Sheep and Old Woman join in Worm warfare.

The fiendishly addictive strategy game, Worms, is back — and with a vengeance. How good is it? Well, if the scrum that followed its arrival in the PCW office is any indication, it's better than ever.

Worms II has a whole new slew of diabolical weapons, twisted songs, devilish sound effects and hilarious comic scenes to keep you occupied for months. Bleary-eyed, I can attest to its superb playability. With millions of bizarre terrain combinations and the chance to create your own, you'll be lucky if that report gets finished by June. There are also myriad options from which to choose, letting you set your own warped preferences for mass destruction.

Tired of the wimpy cluster bomb and dynamite stick? Belt your foes with the Baseball Bat, or give them a taste of "death



by mutton from the skies" — the deadly Sheep Strike. But beware of turning to the "Dark Side" of Worms. If you pathetically try to hide in nooks and crannies, your enemies can now turn loose Super Sheep and Old Woman, on seek-and-destroy missions. And with the frothing Mad Cow, they'll literally blow up your worms till the cows come home.

Lambaste the competition with a sheep!

In a final blow to office productivity, you can now play Worms over a network or the internet, and the message facility lets you chat to your co-workers while you solidify your plans for world domination by blowing them to kingdom come. So if you ring us and there's no answer, you'll know why.

Susan Pederson

PCW Details

Price £29.99

Contact Team 17; 01924 267776

www.worms2.com

System Requirements 75MHz or faster, 16Mb RAM, Win95 or NT, SVGA, 1Mb video card, 2X CD-ROM drive, DirectX 5-compatible sound and video card drivers. Recommended: 133MHz, 32Mb RAM, 2/4Mb video card, 8X CD-ROM.

★★★★★

Dilbert's desktop games

The funny side of klutzy colleagues and boring bosses.



If, like many nineties people, you're hideously overworked, scandalously underpaid and tragically under-appreciated, you should take a look at the Dilbert cartoons. This CD-ROM will help put some of the joy back into using your PC. All ten games and activities can be played in small chunks. "Boss Evaders" works like space invaders but is a lot more fun. "Enduring Fools" could help ease your pent-up aggression: with Dilbert's stun gun, you get to zap insipid idiots as they pop up. Scoring a direct hit is extremely satisfying, especially as they spout annoying sayings such as "okey dokey, smokey". There is a range of activities, some of which you can use to pep up your reports. Impress your boss by running your next memo through the



Jargonator. Chances are it will be three times as long and peppered with words such as "macroenvironment".

If a real-life managerial clone (i.e. your boss) suddenly turns up, you can avoid immediate detection by hitting the Alt and Tab keys. Or you could explain how the CD-ROM helps build managerial skills: it

There are ten games and four activities — you might never have to do any real work again!

offers indispensable tips like "remember, teamwork means getting others to do the work for you". Technically there is some truth in this, so if your boss decides to implement the CD office-wide in an attempt to cut the training budget, you will also gain your co-workers' admiration and respect.

Lynley Oram

PCW Details

Price £19.99

Contact Microsoft 0345 002000 www.microsoft.com; www.dreamworksgames.com

System Requirements Min 486, 2X CD-ROM, 8Mb RAM, 256-colour video card, Windows 95 or NT, sound card, mouse.

★★★★

Shanghai: Dynasty

Like a Ming vase, this game is a treasure for the whole family.

This latest title in the Shanghai series is a game of strategy and immense patience. The CD-ROM contains five games in one: four versions of Shanghai — Classic, Pandemonium, Dynasty — and an easy one for the kids. Mah-jong is the other game in the package. It is the original Chinese game, centuries old and the inspiration for Shanghai. It is similar to the game of Rummy, and the aim of the game is to go out first with a winning hand comprising 14 tiles.

Shanghai uses mah-jong tiles. There are either 72 or 144 tiles arranged in one of several layouts and the object of the game is to remove all the tiles from the layout, one pair at a time. To remove a pair, the tiles must match and must have no other tile on



top of it or at either side. You could compare it to solitaire or Tetris — it is guaranteed to de-stress you.

You can play this game on your own or in two-player mode, but the latter can only be achieved on the same computer, using the same mouse, which is unfortunate.

A bonus of this game is its design and animation. Each pair of tiles has a beautiful

The tile designs alone are enough to make this game a pleasure

picture or inscription on it and when a pair matches, you are made aware of it by varied animation, including a fire-breathing dragon, entwining bamboo shoots, and money, symbolising your success.

This is a super-packed CD-ROM full of beautiful Chinese designs. Buy it if you need a bit of tranquility in your life.

Etelka Clark

PCW Details

Price £24.99

Contact Activision 01895 456700 www.activision.com

System Requirements PC: 60MHz Pentium or faster, 16Mb RAM, Win95. MacOS: PowerPC, 16Mb RAM, MacOS v7.0 or higher, Sound Manager or higher.

★★★★

Brainteasers

Quickie

As I cycle to work each day, which part of my bicycle is going backwards?

This month's prize puzzle

I noticed last month that my gas bill was for exactly the same amount as my electricity bill, except that the pounds and pence values were reversed. The gas bill was the larger of the two but neither was for more than £100. Furthermore, the sum of the two bills was an exact multiple of the difference between them. How much did I have to pay for my electricity last month?

Winner of January 98 prize puzzle

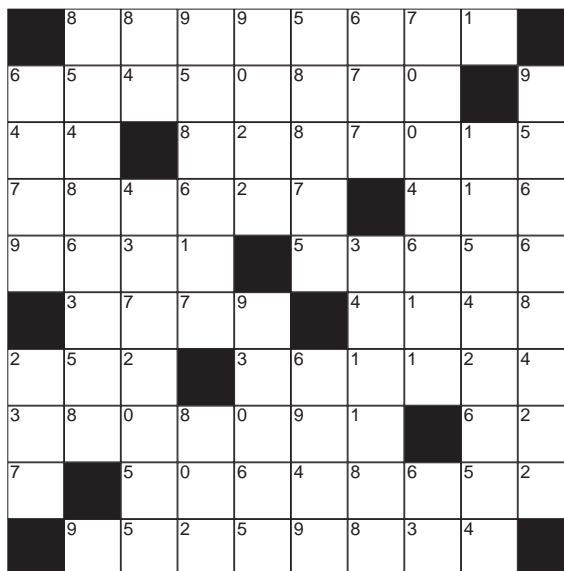
A huge response — 300 entries — indicating that the puzzle was very easy.

Well, that's our intention with the Christmas number crossword: we assume that the brains are likely to be more addled than usual over the holiday period!

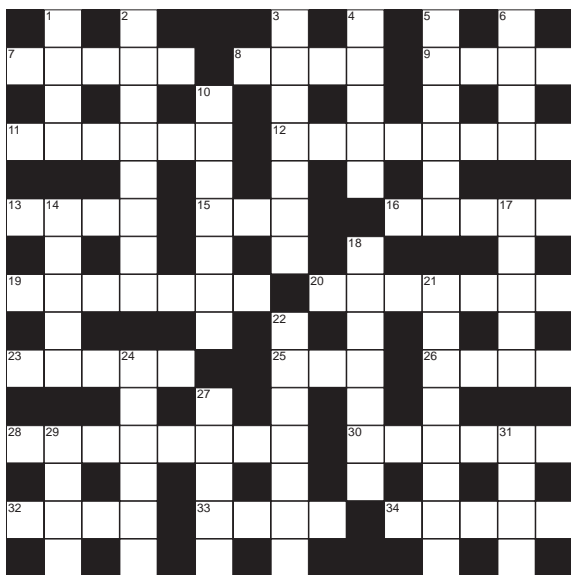
Our winner (and everyone seemed to have the right answer) was Mr (or Ms) S Silverstein of Haywards Heath, Sussex.

Congratulations, your prize will be with you shortly. The winning solution is →

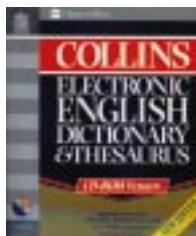
Meanwhile, to all the others — keep trying, it could be your turn next.



Prize Crossword No. 6



Haven't got a clue? Maybe you could do with the help of the Collins Electronic Dictionary &



Thesaurus. Each month, we're offering one lucky PCW reader the chance to win a copy. Send your completed crossword to PCW March Prize Crossword, VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive by 10th April 1998.

• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

DOWN

- 1 Operator (4)
- 2 Repel (5, 3)
- 3 Drawback, danger (7)
- 4 Vauxhall's telecoms satellite? (5)
- 5 Idly surf (6)
- 6 Bucket (4)
- 10 Need (7)
- 14 Proprietor (5)
- 17 Last Greek letter (5)
- 18 Tricky problem (7)
- 21 Aided (8)
- 22 Hold forth, speak (7)
- 24 Praises (6)
- 27 Rugby formation (5)
- 29 Speed (4)
- 31 Kids' observation game (1-3)

ACROSS

- 7 'Plain text' as it was known (abbrev) (5)
- 8 Net graphics formats (4)
- 9 '... me', tedious software document(4)
- 11 Net archive search program (6)
- 12 Digital protection against external dangers (8)
- 13 Programmers move on! (2, 2)
- 15 Net addressing system (abbrev) (3)
- 16 Free 'for show' versions (5)
- 19 The 'U' of 15 across (7)

- 20 Copied illegally (7)
- 23 Visual subdirectory structures (5)
- 25 'Do it!' extension (abbrev) (3)
- 26 Tedious communication flooding the net (4)
- 28 Accepted rules for net communication (8)
- 30 Pre-Netscape browser par excellence (6)
- 32 Net language (inits) (4)
- 33 Classic operating system (4)
- 34 Audible error signals (5)

March solutions

- ACROSS
 7 Networks 9 Laptop 10 Help 11 Megabytes
 12 Cache 14 Refresh 18 Sectors 19 Cookies
 22 Escapes 24 Syncs 26 Eyestrain 28 Port
 29 Server 30 Download
- DOWN
 1 Relegated 2 Swap 3 Crime 4 Slab 5 Spites
 6 Boss 8 Signed 13 Hut 15 Room 16 Area
 17 Mercurial 20 Key 21 Demand 23 Shelve
 25 Knows 26 Even 27 Turn 28 Pull

Stock **item**

The Osborne 1 portable was the height of cool. But CP/M, the mark II and poor stock control killed it off, recalls Simon Collin.

There was something particularly proud about an Osborne owner. I have seen smartly-dressed men attempting to walk nonchalantly along the pavement while carrying this new luggable trendsetter, steel case glinting in the sunshine and perspiration forming with the effort of carrying the hefty 24lb beast.

The Osborne 1 was (almost) the first portable computer with integrated screen, keyboard, drives and processor. If you have a home filing cabinet, then this is exactly what the Osborne looked like. You laid the beast on its side and flipped open the lid revealing the vast 3in amber monitor (yes, glass monitor), twin 5.25in floppy drives and a full-size keyboard on the inside of the lid. The rest of the box contained processor, driver electronics and main memory.

I never owned an Osborne but I knew whizzkids who did. They would run frighteningly complex algorithms through the poor thing, then peer at the tables of results on the monitor, clucking quietly with satisfaction. Although I cannot give you the benefit of my own experience, I can tell you about its rather unusual start in life: proof that political activism and book publishing can a computer entrepreneur make.

Lee Felsenstein was an engineer and political activist who believed in computing for everyone and the free exchange of ideas and information. He was one of the original hacker nerds, forever tinkering with electronics and inventing. You might have noticed that I didn't start off by stating that the Osborne was the first combined portable. In fact, this honour goes to Felsenstein and fellow hardware hacker Bob Marsh, who joined forces in 1976 to design the first computer that combined monitor and keyboard: the SOL.

Let's skip back again, this time to Adam Osborne. He was busy building up a computer book publishing business called, appropriately, Osborne Publishing. Then, in the late seventies, Osborne sold his company for a tidy sum to McGraw-Hill (I'm sure you own at least one McGraw-Hill-
Osborne title) and decided to become a

computer entrepreneur. Brave move.

In 1980 Mr Osborne set up Osborne Computers and asked Felsenstein and Marsh to design him a portable computer with a keyboard and monitor integrated into a case. The design was based on their earlier SOL computer. And so, the Osborne 1 Portable was born. The new computer was an immediate and massive success.

if you did not have a compatible, you were dead in the water.

Mr Osborne and designers set about creating a new, smaller, lighter, faster and PC-compatible luggable. He pre-announced the Osborne II computer to eager buyers who, obviously, stopped buying the older model. This was fine, except he still had a warehouse full of



Oh, for those pioneering days of the Osborne 1: note the huge 3in screen!

It is safe to say that it revolutionised the way users looked at computers and sparked interest in the portable market. But where Osborne really scored with his marketing hat on was in creating the computer-bundle deal. The first Osborne arrived with over £1,000-worth of free business software including WordStar, SuperCalc, Basic and CP/M utilities.

Unfortunately, those last two words were the big problem for future Osborne sales. The computer was running CP/M and was not an IBM PC compatible. As IBM and Compaq began to carve up the corporate market, it soon became clear that

model 1 computers. So eventually the company ceased trading. But in 1990, a new chapter opened for the Osborne. A Canadian company, Premier Automation, decided that the retro-look transportable was the next new market and so acquired the Osborne name and logo. It launched a range of transportables based on the original Osborne look. Since then, I have drawn a blank. Well, almost. I know that Felsenstein spent much of his income on free computers for US public libraries and set up a free-idea group in Moscow.

Cool designer, trendsetting computer, poor stock control. ■

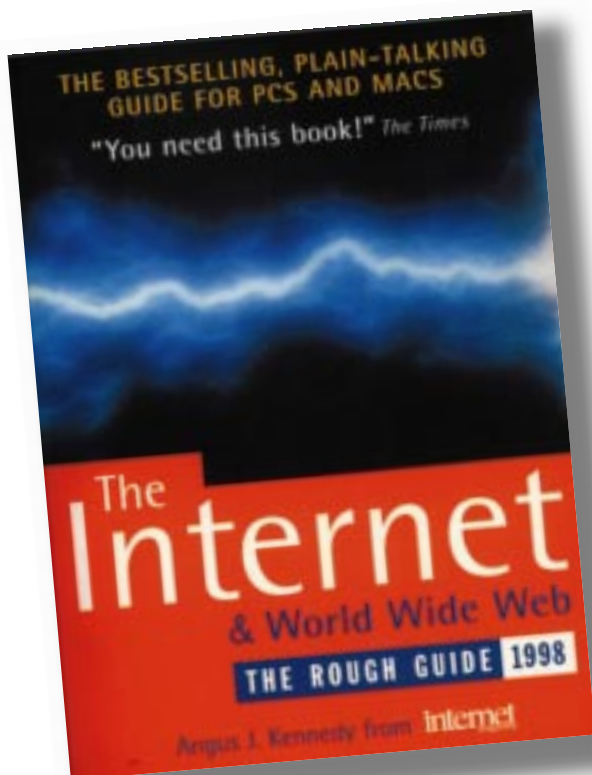
Books

With this Rough Guide you need a modem and an ISP, not a backpack and sandals. Gen up on the future and IT disasters, too.

■ The Rough Guide to the Internet & World Wide Web

This book is a pocket-sized miracle, perfect for people who want to know everything about the internet. It teaches you the standard things, like how to get connected, as well as explaining, in plain English, topics such as payments, the difference between the service providers and anything else that might have baffled you.

Among the explanations and advice in this book, you're also provided with the URLs to 800 web sites. Almost every topic you can think of is covered, from banking to health, to government, shopping and fashion, to science and space. Name a topic you want to investigate and the chances are that the best sites covering it are recommended within these pages.



The internet may be a recent phenomenon but what a lot of people don't know is that it has been around since the sixties. At the back of this book there is a whole section dedicated to

the history of the internet, talking about the role it played in 1957 at the height of the Cold War, how the wired world developed and how it blossomed into the monstrosity it is now. This is powerful information with which you can wow your friends and convince them that you truly are an internet guru.

There is also a very useful glossary that will simplify any problems you may be having with the terminology. The author, Angus J Kennedy, writes for *Internet* magazine, so if you purchase this book you can get a subscription for only £15.

Anyone whose career includes searching the net for information, such as students, researchers and journalists, will get a lot out of this book. All in all, it can be described as a cheap internet bible and a handy piece of literature to have if you surf quite often.

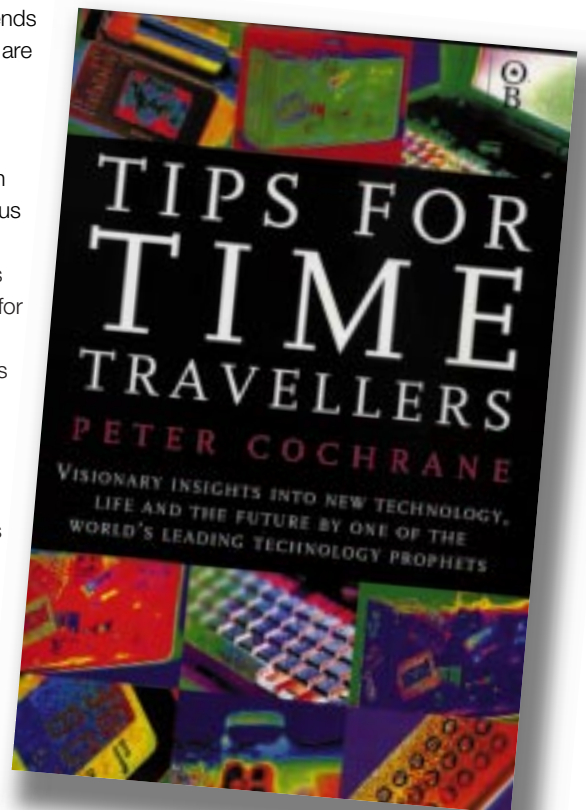
Etelka Clark

■ Tips for Time Travellers

"For tribal man, space was the uncontrollable mystery. For technological man, it is time that occupies the same role." So reads the frontispiece quote from wildly hip culture guru Marshall McLuhan in Peter Cochrane's book *Tips for Time Travellers*. The quote sets an appropriately ambitious tone for the book because, just as Marshall was never a guy to think small, neither is Professor Cochrane.

As the head of research at BT Labs, Cochrane has made a living out of not only predicting the future of technology, but also helping to bring it to reality. From the outset it is clear that Cochrane is not exactly the

master of understatement. The first sentence of his introduction assures us: "This may be the most unusual book you ever buy or read". The content, format, purpose and style, he says, are



unconventional by design to meet the needs of busy people.

Divided into "subject bytes" of about 600 words (or about 24Kb, he tells us) his enthusiastic monologues are designed to be read while you grab a coffee, sit in a taxi or wait for your email to download. Even the font, point and line spacing, he says, "...have been deliberately selected to minimise the need for good lighting and the onset of motion sickness". This I can personally attest to, as I read a good half of it standing in London's Oxford Street at 2am one morning waiting for the night bus to turn up.

Ironically, the book is sometimes let down by Cochrane's brevity. Reading it is a little like trying to watch television while

someone else keeps flicking through the channels: just as you start to get interested, it's gone. Many of the monologues would benefit from an extra 600 words, just so he could develop his ideas a bit further. He dips in and out of topics as diverse as artificial intelligence, virtual reality, network strategies and organisational management, at lightning speed, stopping off at computer-human interaction, cyborgs and technological clothing along the way.

Some of his ideas are so good that you can't believe they haven't been put into practice yet. For instance, his suggestion for a Richter-type scale for network breakdowns and the revelation that people work 20 percent more efficiently when they lay their computer screens flat down on their desks. He also has some fascinating thoughts on why some people crash their computers more often than other people do, suggesting that using a computer is like playing the piano: some people may just be more at one with the instrument.

One glance at the rave reviews on the book jacket from techie luminaries such as MIT's Nicholas Negroponte and science-fiction author Douglas Adams should convince you that Peter Cochrane is someone whose ideas we should indeed take seriously.

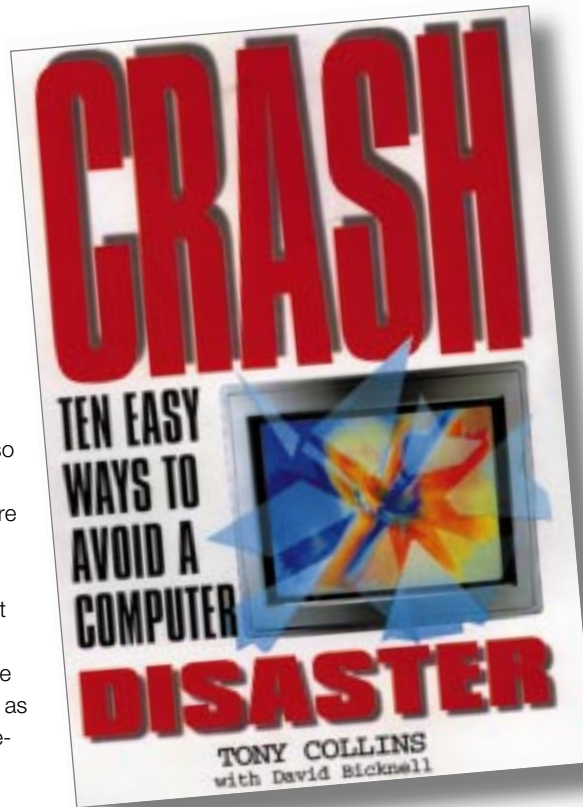
Tips for Time Travellers leaves you with the impression that this is someone with whom you wouldn't mind being trapped in a lift, or sitting next to at an otherwise deadly dinner party.

Most of the book has already appeared in Cochrane's weekly *Daily Telegraph* columns, but it's still worth another peek, if only to get a few more insights into the man who could brainstorm for Britain.

Susan Pederson

Crash

■ Are you looking for a disaster novel to keep you up at night? If so, you should try *Crash*, the book that chronicles computer disasters. No company, be it big or small,



is safe, and neither are government agencies.

Some of the worst computer disasters in living memory are detailed, showing how an initially bright idea can go so horribly wrong. Written a little tongue in cheek, well-publicised computer mishaps like the Wessex Regional Health Authority's integrated information system for its 300 hospitals, and the Department of Social Security system upgrade, among other government departments, are examined in

depth. Read the book if you want to find out what happened — but not if you're an IT manager with a nervous disposition.

What is surprising is the number of other disasters that Collins has uncovered: most of these would not have received much publicity. As a manual for any chief executive who is about to embark on a large IT initiative, *Crash* serves as a bible of commandments never to be broken, lest you risk the credibility of your business.

Computers seem, at least to Collins, to cast a spell over everyone who uses them. Millions of pounds later and with no workable system to show for it, managers move into buck-passing mode and look for a likely scapegoat. More often than not, this is the IT consultant.

Overall, *Crash* is a great chronicle of 165 years of computing disasters, but it focuses a little too heavily on the modern age. We could perhaps have learnt something in those early days. In 1830 Charles Babbage invented the first computer called the Difference Engine. The project went over budget and was abandoned. History, it would seem, does repeat itself, again and again.

Dave Howell

Top Ten Books

1	The Internet & World Wide Web: The Rough Guide 1998	Rough Guides	£5.00
2	UML Distilled: Applying the Standard Object Modelling Language	Addison-Wesley	£23.95
3	C++ Programming Language, 3rd Edition	Addison-Wesley	£27.95
4	Java in a Nutshell, 2nd Edition	O'Reilly	£14.95
5	Software Project Survival Guide	Microsoft Press	£22.49
6	Windows NT in a Nutshell	O'Reilly	£14.95
7	Microsoft Excel 97 Visual Basic Step by Step	Microsoft Press	£32.99
8	Java Examples in a Nutshell	O'Reilly	£14.95
9	Instant UML	Wrox	£32.49
10	Effective C++, 2nd Edition	Addison-Wesley	£25.95

Prices include VAT on disks and CD-ROMs. List supplied by The PC Bookshop, 21 Sicilian Avenue, London WC1A 2QH. Telephone: 0171 831 0022. Fax: 0171 831 0443

PCW Details

Rough Guide to the Internet & World Wide Web 1998

Author Angus J Kennedy

Publisher Rough Guides

ISBN 1-85828-288-8

Price £5

★★★★★



Tips for Time Travellers

Author Peter Cochrane

Publisher Orion Business Publishing

ISBN 0-75281-349-8

Price £14.99

★★★★

Crash

Author Tony Collins

Publisher Simon & Schuster

ISBN 0-684-81688-1

Price £20

★★★★

Win one of these super software packages

With this month's prizes you can build web applications, set up your own home office and even relax awhile by being an armchair F1 racing driver, with these Schumacher PC accessories.

MS Visual Studio 97 Enterprise Edition

This month, you have the chance of an early Easter present. To mark the anniversary of the launch of Visual Studio 97 in March 1997, Mike Pryke Smith, Internet and Developer Tools product

manager at Microsoft Ltd, is giving you the chance to win a copy of the fabulous Visual Studio 97 Enterprise edition worth £1,398!

This prize includes: Visual Basic programming system 5.0,

Visual C++ development system 5.0, Visual FoxPro database management system 5.0, Visual J++ development software 1.1, Visual InterDev web development system, Microsoft Developer Network (MSDN) Library Reference CD-ROM, SQL Server 6.5 Developer Edition (a "develop and test" licence for five users), Visual Source Safe version control system 5.0, Microsoft Repository, Microsoft Visual Modeler, and RDO 2.0.

You can build open-distributed web applications, scale traditional client-server apps to multi-tiered server-based solutions, and add public web interfaces to existing business systems. The simplicity of operation of these tools, which work in ways both authors and development coders are familiar with, means the changes are transparent, manifesting themselves in increased productivity.

■ To enter this competition, simply write your answer to the following question on

a postcard, or on the back of a sealed envelope (see box, right) clearly marking your entry "Visual Studio":

Q When was Visual Studio 97 launched?

ClarisWorks Office

This competition is perfect for people who work from home or in a business.

Claris Corporation is offering five copies of ClarisWorks Office worth £100 each.

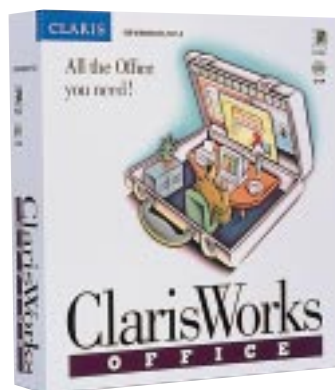
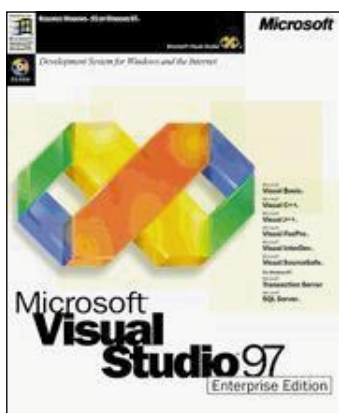
ClarisWorks Office has been designed for users who need instant productivity and do not have dedicated support technicians to back them up. It comprises ClarisWorks 5.0, JIAN BusinessBasics (Claris Edition), 175 customisable documents, internet software and Claris Home Page Lite.

With these full-featured productivity tools, customised documents, plus the power of the internet, ClarisWorks Office lets users create everything they need, from memos to presentations, customer lists to mailing labels, custom web pages to invitations, balance sheets to home budgets and business reports to family newsletters.

■ To win a copy of this software, just write "Claris comp" on a postcard, or the back of a sealed envelope (see box, right).

The Michael Schumacher Collection

Boeder is giving 20 readers the chance to race around their PCs with the new Michael Schumacher Collection of computer accessories: there's a Schumacher F1-shaped mouse mat, Ferrari-red F1 joystick



and an F1-shaped red-and-black mouse, all featuring Michael Schumacher's autograph. Each set is worth £50.

■ To win a set, just write "Schumacher comp" on a postcard, or the back of a sealed envelope (see box, below).

db boeder
boeder for computers

How to enter the competitions

1. Via our web site at www.pcw.co.uk, or
2. Write your name, address, daytime phone number, and answer (where applicable) on a postcard, or the back of a sealed envelope. Mark your card with the name of the competition and send it to: PCW April Competition, P.O. Box 191, Woking, Surrey GU21 1FT.

Entries must arrive by 24th April 1998

• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Rules of entry

These competitions are open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Microsoft Corp, Claris Corp, and Boeder.

The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

No-nonsense Buyer's Guide



The PCW Buyer's Guide is packed with sensible advice about what to buy and how to buy it safely. Buying direct through our pages can save you hundreds of pounds, but do stick to our 12-point guide to buying direct.

Twelve rules for buying safely

1. Always use a PCW order form.
2. Keep the original advertisement.
3. Keep copies of all correspondence. If you speak on the phone make a note of to whom you spoke.
4. On large orders, obtain a written quotation.
5. If possible, pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.
6. Does the price quoted include everything discussed? Is VAT extra?
7. Check how the supplier will deliver and whether or not delivery times are guaranteed.
8. Is free telephone technical support included in the price? Some suppliers offer support only on premium 0891 numbers. Is it easy to get through? Try dialling the number to test it out.
9. Is the warranty return-to-base or onsite? "Return-to-base" means that you'll have to pay to ship the product back to the supplier.
10. If you're paying extra for online support, does the manufacturer offer guaranteed response times? If you rely on your PC for your business you'll need it fixed, pronto.
11. Is the supplier reputable? Does it comply with BS5750 or ISO900? If in doubt, ask to see customer testimonials.
12. When your PC arrives, check that all branded components are genuine.

Buying a PC

PCs get cheaper and faster all the time and your state-of-the-art PC can quickly become outdated. That may not matter, though, if it still does what you require. But if you're buying a new general-purpose PC now, it should be fitted with a CD-ROM drive, sound card and speakers so that you'll be able to play games and run a wide range of modern software.

Minimum specifications

- It is a false economy to buy a new PC with less than 16Mb of RAM. The jump from 8Mb to 16Mb of RAM makes a huge difference to performance.
- Ensure Pentium motherboards have an Intel Triton 430 VX, HX, TX, LX or compatible chipset.
- Avoid 14in monitors. The difference between 14in and 15in doesn't sound much but means the screen is 15 percent smaller. If you can afford it, buy a 17in monitor.

Other things to consider

Most small PC manufacturers buy their motherboards from Taiwanese or far eastern manufacturers. Larger companies either design their own motherboards (e.g. Apricot, Compaq, IBM) or get motherboards built to their specification (e.g. Gateway). Intel chips are no longer the only choice. AMD's K6 processors are well worth considering, too. It is amazing how hard disks fill up and it's unusual to have *too much* disk space.

Some suppliers offer you the choice of Windows 95 or Windows NT. For general home or small office use, Windows 95 is still the best choice. You may need to consider NT for some specialist applications like programming, DTP or CAD.

Practically every month, CD-ROM drives get faster. Higher speeds and bigger numbers just mean you can access files from them more quickly and that video clips on them play more smoothly.

Look closely at the software that's bundled with your PC. If you want an Office suite it's usually cheaper to buy it bundled with your PC. Software bundles can also be an excuse for manufacturers to unload piles of old or second-rate software. Check whether you get the original media if you need to re-install.

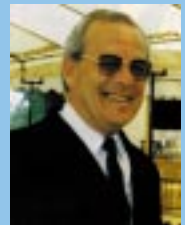
For this Buyer's Guide we've drawn up four specifications. We haven't mentioned particular manufacturers because you'll find up-to-date PC reviews in every issue of PCW.

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Anthony George

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PCW Second-hand spec

Buying second-hand or discontinued kit is the cheapest way to get started. This is the minimum spec we think you should choose for general business use, playing games and accessing the internet.

- Windows 3.1 or 3.11
- 90MHz Pentium processor
- 16Mb RAM
- Graphics card with 1Mb of memory
- 1Gb hard disk
- 3.5in floppy disk
- CD-ROM drive
- 14in colour monitor

PCW Minimum specification

This is the absolute minimum spec we think you should consider if you are buying a new PC. Suitable for general business use: word processing, databases, spreadsheets and, with a modem, accessing the internet.

- Windows 95
- Pentium 166MHz MMX processor
- 32Mb RAM
- Graphics card with 2Gb of memory
- 1.2Gb hard disk
- 12-speed CD-ROM drive
- 15in colour monitor

PCW Recommended spec

If you are not short of cash, this is the specification we recommend. No-one at PCW would settle for less.

- Windows 95 or Windows NT 4.0
- Pentium or equivalent 233MHz PII processor
- 32Mb EDO RAM
- 3D graphics card with 4Mb of memory
- 4Gb hard disk (modern computer software takes up a lot of space)
- 16-speed CD-ROM drive
- 17in colour monitor
- 16-bit SoundBlaster-compatible sound card

PCW Best specification

This is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need even more memory, a bigger hard disk, a more powerful graphics card or a larger monitor.

- Windows 95 or Windows NT 4.0
- 333MHz PII
- 64Mb SDRAM
- 8Gb hard disk
- 20-speed CD-ROM drive
- 19in colour monitor
- 4Mb VRAM or WRAM graphics card (this means your graphics card can display more colours, and at a higher resolution on your monitor: 16 million colours at a resolution of up to 1,280 x 1,024)
- 16-bit wavetable sound card

Buying a Notebook

Notebooks belong in the one area in which it is often safer to stick to brand names. It is not so much that some of the Far Eastern kit doesn't work perfectly well, but reliability seems to be a problem and it can be fiendishly difficult to obtain spares. A useful guideline when choosing a notebook is to try before you buy.

Remember that standard notebook specifications are generally a step or two behind their desktop equivalents.

What to look for in a notebook

■ **Pointing device** There has been a move away from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a device which looks like the rubber on top of a pencil and is controlled by the use of one finger).

■ **CD-ROM drives** These are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.

■ **Floppy disk drive** Often, there is a choice between a CD-ROM drive and a floppy disk drive. If the notebook is to be your only machine, make sure that the CD-ROM drive and the floppy drive can be used simultaneously.

■ **PC Cards** Modern notebooks all have at least one PC Card slot. They take credit card-sized expansion cards which add a fax-modem, a network interface card or even an extra hard disk to your computer.

■ **Battery life** Battery life varies, from as little as 30 minutes to over six hours. Lithium Ion and Nickel Metal Hydride batteries have now replaced the older NiCad (Nickel-Cadmium) batteries.

■ **TFT screens** TFT screens are of a higher quality than dual-scan or passive-matrix screens, using a sharper picture and no shadowing or ghosting.

■ **Warranty** Drop a notebook and it may break, so it is vital to check the terms of your warranty. How long is it? What level of service is provided? Remember — better safe than sorry.

PCW Minimum specification

Notebooks change quickly. It is possible to pick up end-of-line machines with Pentium processors from brand-name manufacturers like Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use.

PCW Recommended spec

- Windows 95
- Pentium 166MHz
- 16Mb RAM
- On-board graphics with 1Mb of memory, PCI local bus
- 2.5Gb hard disk, 3.5in floppy disk drive and/or 6X CD-ROM drive
- TFT 800 x 600 screen

PCW Best specification

The state-of-the-art notebook: either you're loaded, or your company's picking up the tab.

- Windows 95 or Windows NT
- Pentium 266MMX
- 512Kb secondary cache
- 64Mb RAM
- On-board graphics with 2Mb of VRAM memory, PCI local bus
- 5Gb hard disk
- 3.5in floppy disk drive
- 20-speed CD-ROM drive
- Active matrix 1,024 x 768 TFT screen
- Long battery life



Glossary

of computing terms

A

Access time

The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

Applications

An application, or package, is one or more programs used for a particular task. For example, word processing, invoicing or spreadsheeting. Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for specific uses.

ASCII (American Standard Code for Information Interchange)

Usually a synonym for plain text without any formatting (like italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary in order for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

B

Backwards compatible

Compatibility of hardware or software to older versions of the product or standard.

Baud rate

The number of electronic signals that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V and Bit).

BIOS

Basic Input/Output System. Software routines that let your computer address other devices like the keyboard, monitor and disk drives.

Bit

Binary digit, the basic binary unit for storing data. It can either be 0 or 1. A Kilobit (Kbit) is 2^{10} (1,024 bits); and a Megabit is 2^{20} , which is just over a million bits. These units are often used for data transmission. For data storage, megabytes are more generally used. A megabyte (Mb) is 1,024 kilobytes (Kb) and a Kb is 1,024 bytes. A gigabyte (Gb) is 1,024Mb. A byte (binary digit eight) is composed of eight bits.

Bug (See Crash)

Boot

Short for bootstrap. Refers to the process when a computer loads its operating system

into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press CtrlAltDel) or a cold reboot, where you switch the computer off and back on again.

Bus

A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

C

Cache (See Memory)

COAST

Cache On A Stick.

CD-ROM

A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data: equivalent to about 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, yet this makes them ideal for archiving.

CISC (See RISC)

CPU

Central Processing Unit. Normally refers to the main processor or chip inside a PC. (See Processor.)

Crash

Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software) or a GPF.

D

DRAM (See Memory)

DOS (Disk Operating System)

Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

DPI (Dots Per Inch)

Common measure of the resolution on a printer, a scanner or a display.

Drive controller card

An expansion card that interprets commands between the processor and the disk drives.

Drivers

Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac just by loading up the relevant driver on each machine.

E

EIDE (See IDE)

EISA (Extended Industry Standard Architecture)

A bus standard designed to compete with MCA. Now being replaced by PCI.

Electronic mail (E-mail, email)

Still the biggest single use of the internet.

When you sign up with an ISP you are given an email address. Usually you can incorporate your name, or part of it, into your email address to make it easy to remember.

Expansion card

Circuit boards which fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external version (which is more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

F

Floppy disk drive

Practically all PCs come with a floppy disk drive: 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy, 5.25in disks.

Fonts

A font is an alphabet designed in a particular style. Fonts apply both to screen and printed letters. TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

Format

To wipe a floppy or hard disk in order to prepare it to accept data.

G

GPF

General protection fault.

Graphics card

An expansion card which interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

GUI (Graphical User Interface)

(See Windows)

H

Hard disk

Sometimes called a fixed disk, hard disks are hermetically sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb but disks of up to 9Gb are available.

Hardware

All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

HTML (Hypertext mark-up language)

The standard language used in the creation of web pages, which can be read by web browsers.

I

IBM-compatible

Originally meant any PC compatible with DOS.

Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

IDE (Integrated Drive Electronics)

A control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features.

Internet

Millions of computers interconnected in a global network.

ISP (Internet Service Provider)

ISPs provide access to the internet. You use your modem to dial the ISP's modem. The ISP has a high-bandwidth permanent connection to the internet.

IRDA (Infra-Red Data Association)

The standard for exchanging data using infra-red, typically from PDAs or notebooks to a PC or printer.

ISA (Industry Standard Architecture)

This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it remains in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI.)

ISDN (Integrated Services Digital Network)

Offers significant advantages over analogue telephone lines. It can handle multiple transfers on a single connection and is faster. In the UK, however, costs of installation and rental remain high.

J

JPEG (See MPEG)

K

Kbit (kilobit), Kb (kilobyte)

(See Bit)

L

LAN (Local Area Network)

(See Network)

Local Bus

PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it replaces.

M

Macintosh (Mac)

A personal computer made by Apple and which is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows but pre-dates it and (in some people's view) looks and works much better.

Maths co-processor

A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

Mbit (megabit) (See Bit)

Mb (megabyte) (See Bit)

MCA

A type of bus designed by IBM to beat EISA. Although faster, it never became popular: this was because every machine that used it had

to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

MPEG (Moving Picture Expert Group)

A standard for compressing video, available in several flavours: MPEG 1, MPEG 2, MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

Memory

The term normally refers to RAM (Random Access Memory). This is the kind which disappears when you turn off your computer and is much faster to access than a hard disk. It acts as a staging post between your computer's hard disk and its main processor.

● **Cache memory** Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of in-built cache. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is often used to cache your hard disk.

● **DRAM (Dynamic Random Access Memory)** This requires its contents to be replaced every one thousandth of a second and is the most common form of memory found in PCs.

● **EDO (Extended Data Out RAM)** Memory that is cached to improve performance.

● **FPM RAM (Fast page mode)** Like EDO Ram but without the onboard cache

● **ROM (Read-Only Memory)** A type of memory which can only be read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, like the information the computer requires when you start it up.

● **SDRAM (Synchronous DRAM)** The latest type of fast memory. This runs at the same speed as the processor and allows the input and output of data at the same time.

● **SRAM (StaticRAM)** Retains memory until the power is switched off.

● **VRAM (VideoRAM)** Faster than DRAM, this is used by graphics cards.

MMX (Multimedia extensions)

(See Pentium)

Modem

The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers.

Monitor

Your computer's screen. Signals are sent to it from the video card.

Motherboard

The main printed circuit board which houses processor, memory and other components.

N

Network

A network is a group of computers linked together with cable. The most common form of network is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. All the PCs on a LAN are connected to one server, which is a powerful PC with a large hard disk that can be shared by everyone.

O

OS (Operating System)

The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

P

PC Card

Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit card-sized cards.

PDA (Personal Digital Assistant)

Small electronic organisers. The Psion 3a is a typical example.

PCI (See Local bus)

PCMCIA (See PC Card)

Package (See Applications)

Parallel ports

Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

Pentium

Fast 32-bit processor with a built-in 16Kb cache. Now the standard on PCs. It is about to be replaced by the Pentium MMX chip which has extra instructions and a 32Kb cache. The Pentium Pro is a higher-end workstation CPU with 256Kb cache meant for full 32-bit operating systems like Windows NT.

Pixel

Picture element. The smallest addressable dot displayed on a monitor.

PowerPC

This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

Processor

Chip which does most of a computer's work.

Programs (See Applications)

Public domain

Software that is absolutely free. The author usually retains the copyright but you can make as many copies as you want and pass them to other people. "Public domain" software is often confused with "shareware".

Q

QWERTY

The name of a standard English-language keyboard, derived from the first six letters in the top row. French equivalent is AZERTY.

R

RAM (Random Access Memory)

(See Memory)

Reboot

(See Boot)

RISC (Reduced Instruction Set Computing)

These are beginning to replace CISC (Complex Instruction Set Computing) as they're usually faster. The PowerPC chip is a typical example.

ROM (Read Only Memory)

(See Memory)

RTF (Rich Text Format)

(See ASCII)

S**SCSI**

Small Computer System Interface is a bus that comes as standard in a Macintosh and is beginning to rival EIDE on PCs.

Serial port

Serial ports (com1 and com2) are used by your PC to communicate with the outside world. Mostly used by modems and similar devices which communicate quite slowly. Faster communications are achieved through the parallel port.

Shareware

A method of distributing software. It is freely available, but not free of charge. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

SIMM (Single Inline Memory Module)

The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities up to 16Mb.

T**Tape streamer**

Magnetic tape recorder for backing up data from a hard disk.

U/V**UART (Universal Asynchronous Receiver Transmitter)**

Pronounced "you-art", this is a chip that allows

your PC to cope with high-speed communications.

V.34 Plus, V.34, V.32bis

A series of CCITT standards which define modem operations and error correction. There are more than 20, but the key ones are:

- **V.32bis**, the standard for 14.4Kbps (kilobits per second) modems.
- **V.34**, the standard for 28.8Kbps modems (see Baud).
- **V.34 Plus**, the new standard for speeds up to 33.6Kbps.

VESA (See Local Bus)**VGA**

Video Graphics Array is the name given to a popular display. VGA graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1,024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

VL-Bus (See Local Bus)**VRAM (See Memory)****W****Windows**

A GUI (Graphical User Interface) developed by Microsoft. Windows is intended to make programs easier to use by giving them a standard, mouse-driven interface.

- **Windows 3.11** 16-bit operating system.

- **Windows NT** Robust, fully 32-bit operating system from Microsoft. The latest, version 4.0, features a Windows 95 interface.

- **Windows 95** Major improvement to Windows 3.11, with a redesigned interface. Less prone to crashes and easier to use, but requires more memory.

Winsock

Short for "sockets for Windows". The Winsock.dll is an extension for Windows which is necessary for connecting to TCP/IP networks.

World Wide Web

Service on the internet using special software called web browsers (Netscape and Internet Explorer are two best-known browsers) to give access to pages of information with text, pictures and multimedia.

WYSIWYG

"What You See Is What You Get": what you see on the screen is exactly what you will get when you print out your work.

Z**ZIF (Zero Insertion Force)**

Sockets used for large CPUs. Lifting a handle enables you to remove the processor.

ZIP

The common standard for compressing files so that they take up less space. Zipped files have the extension .zip and are compressed and decompressed using shareware utilities such as Winzip and PKZip.

Buying a Printer

There are two main types of printer: laser and inkjet.

Lasers

Most office printers are lasers. They work much like photocopiers. They are cheap to run and print quickly. The disadvantage is the higher initial cost and mono output. Laser printers are available in all sizes and all prices. Small desktop printers cost as little as £300. You can buy colour laser printers but they are still expensive; typically £5,000 or more.

Types of laser

PCs print by sending a description of the page to be printed down a printer cable. There are three commonly-used page description languages (PDLs):

• **PostScript**

This sends an outline in vector form (see Drawing Software) to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so the image looks the same on a monitor (75dpi), a laser printer (300dpi) and a professional image-setter (2,400dpi).

• **PCL (Printer Control Language)**

Hewlett-Packard's alternative to PostScript,

licensed to many clone-printer manufacturers. Printers using PCL tend to be cheaper than PostScript ones, but output will vary from one machine to another, making it less well suited to professional use.

• **GDI (Graphical Device Interface)**

These printers download the description of your page, already used by Windows, straight to your printer. They only work with Windows but are cheap and fast. They are only suitable for a personal printer and will not work across a network.

■ **Inkjets**

Inkjets work by spraying ink onto paper. There are still some mono inkjet printers available, but it is best to stick with a colour inkjet as the price difference is negligible. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour, especially on high-resolution paper.

**PCW** Recommended products**Inkjet printers**

- **Canon BJC-80:** RRP £233; Canon 0121 680 8062 (PCW January 98)
- **ALPS MD-1000:** RRP £299; ALPS 0800 973405 (PCW January 98)

Laser printers

- **Cheap: Panasonic KX-P6300** £217; Panasonic 0500 404041
- **Kyocera F5-600:** £280; Kyocera 01734 311500 (PCW February 1998)
- **Sub-£750: Hewlett-Packard 5P:** HP 01344 369222 (PCW November 95)
- **Network lasers**
- **Hewlett-Packard 5M:** RRP £1,659 ex VAT; HP 01344 369222

Buying a **Multi Function Device**

For home use and in small offices, a hybrid device could be the answer.

Typically, MFDs combine a printer, a fax machine and photocopying and scanning capability into one device. And while this saves space, it does have some drawbacks. For one thing, they tend to be based on inkjet technology which means higher running costs and lower speeds than laser-based units. Many only offer black-and-white printing: while colour models are appearing in greater volume, they tend to be based on earlier inkjet printing technologies rather than the current state-of-the-art models. Also, the scanning quality is no match for a dedicated scanner:

it's normally only 200dpi, which is the same quality as a fax machine and, worse, often black-and-white only. Finally, there's one fundamental problem — if your MFD breaks down, you won't be able to print or receive faxes. That said, they are here to stay, and some people love 'em.



PCW Recommended products

Hewlett-Packard OfficeJet: £650; HP 0990 474747 (PCW January 97).

Buying a **Digital Camera**

Just about every camera manufacturer now offers a budget-priced device and prices start from as little as £135.

A digital camera works like a conventional camera except that instead of a film, it has a grid of light-

sensitive elements. These convert light into a voltage proportional to the brightness, which is then converted into digital information the PC can understand.

The elements produce a colour bitmap file, typically of 640 x 480 pixels, although models boasting 800 x 600, 1024 x 768 and even higher resolutions are becoming increasingly common.

Most digital cameras use flash memory to store images, and offer a wired connection to a computer — slow serial on budget models or fast SCSI on professional ones.

Some cameras feature removable memory cards, usually compatible with the PC

Card standard. Quality is getting better all the time, but to match the print quality of a 35mm film camera today, you'll still have to spend thousands of pounds. The current crop of entry-level to mid-range cameras are, however, more than suitable for electronic publishing on CD-ROM or the internet.



PCW Recommended products

Sony DSC-F1: £546; Sony 0990 424424 (PCW January 98)

Sanyo Digicam: £449.99; Sanyo 01923 477295 (PCW January 98)

Epson Photo PC: £781.38; Epson 0800 289622 (PCW Jan 98)

Choosing an **ISP**

With over 100 ISPs to choose from, choosing an Internet Service Provider has never been so difficult.

All ISPs (Information Service Providers) allow you to send and receive email across the Internet, browse and surf the world wide web and download files from Internet servers. But there are big differences between the quality of service that each provides in terms of technical support and the quality of software supplied when you first sign up. Usually they

charge a flat monthly rate for Internet access of around £10, but on top of that you also have to pay for your phone charges

■ **Choosing a Content Provider**

There are really only three players in this field: AOL, CompuServe and MSN. They are not the best or fastest way of browsing the world wide web. Instead they aim to supply their own content in the form of discussion areas, online magazines and easily searchable file libraries. All these services offer free trials which is a good way of finding out if they're for

PCW Recommended products

Our PCW Award winners in July 97:
Pipex Dial: Major player with an excellent reputation.

BT Internet: BT has now got its act together with internet service provision.

Direct Connection: One of the best of the smaller ISPs.

Content providers

AOL: 0171 385 9404; Consumer-orientated service that offers good performance even for users of older 14.4K modems.

CompuServe: 0800 289378; more business content than AOL.

Buying a **Monitor**

Regardless of your computer application, you'll be looking at your monitor all day, so make sure you get a good one.

Some people claim not to see monitor flicker, but your brain does, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors.

Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes. The resolution refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 x 480 pixels, while other typical modes include 800 x 600 and 1,024 x 768. The more pixels, the more you'll be able to fit on the screen, but

everything will be smaller and may only be suitable on a larger screen. Go for a 15in or 17in monitor capable of running a resolution of 1,024 x 768 non-interlaced at 70Hz or higher.

The visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in screen may only have a 14.5in visible area, and a 17in may have only 16in visible. Aperture grille tubes such as Sony's Trinitron or Mitsubishi's Diamondtron are very bright, but need two fine but visible wires running across the screen for stability.



PCW Recommended products

Mitsubishi DiamondPro 700 (£395 ex VAT); Iiyama Vision Master Pro 17 (£409 ex VAT); Nokia 447ZA (£375 ex VAT); Belinia 10 70 15 (£289 ex VAT). See group test, p192, this issue, for details.

Contacts Panasonic 0500 404041; Taxan 01344 484646; ADI 0181 236 0801; Iiyama 01438 745482



Buying a **Scanner**

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

■ Flatbed scanners

These are the most common type of scanner, and cost from around £300 to more than £3,000.

They are capable of scanning colour pictures to a high standard. Most have transparency adaptors as optional extras.

■ Document scanners

A new category of scanner which aims to combine the reliability of a flatbed scanner with speed and portability. They are intended for OCR and document management. Most will cope with photographs and some with colour, but it's not really their forte.

PCW Recommended products

Document scanners

Visioneer PaperPort VX: street price £299; Computers Unlimited 0181 200 8282
Logitech PageScan Colour: street price £155; Logitech 01344 894300

Flatbed scanners

- **Intermediate**
Agfa Studio Star: street price £499 (ex VAT); Agfa 0181 231 4906 (PCW August 97)
- **Budget**
Umax Astra 610P: £99; IMC 01344 871329 (PCW February 1998)
Microtek Phantom 4800: £147; Midwich Thame 01379 649200 (PCW February 1998)

Buying a **Storage Device**

For backup and storage there's a range of devices available — conventional tape backup devices, superfloppies like the LS120 and proprietary systems like the Iomega Zip drive.

Additional storage devices, taking removable media, offer endless capacity. Iomega's ZIP drive and OR Technologies' a: drive (aka LS120) offer 100Mb and 120Mb respectively. The a: drive is an alternative to a floppy as it is compatible with normal floppies. The ZIP drive only works with ZIP cartridges.

Iomega's Jaz drive and SyQuest's SyJet, take 1Gb and 1.5Gb respectively. The SyJet is quicker and boasts cheaper media, but it's new as against Iomega's proven device.

Larger storage means slow, cheap tape

drives with big capacity, perfect for overnight backup. Most quote compressed capacity, double "native" uncompressed capacity. DAT DDS-2 drives offer 4Gb native, which Seagate matches with faster Travan TR4 cartridges on its TapeStor 8000. Iomega's cheaper, slower Ditto 2000 offers 2Gb compressed backup.

CD recorders, offering double-speed writing and quad-speed reading, are around £400 ex VAT. The fastest are 24-speed, but there's little benefit in anything over 12.



PCW Recommended products

Iomega ZIP Plus: £169.99 (£144.68 ex VAT); Iomega 0800 973194 (PCW March 98)

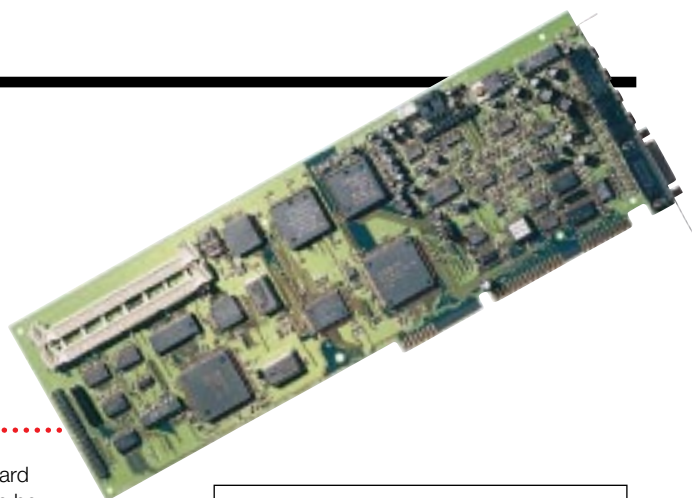
Iomega JAZ drive: internal £189 ex VAT; 1Gb media £60 ex VAT; Iomega 0800 973194 (PCW August 1997)

Iomega Ditto 2000: external £89 ex VAT; Iomega 0800 973194 (PCW July 97)

Seagate TapeStor 8000: internal £220 ex VAT; Seagate Technology 01628 890366 (PCW July 97)

Buying a Sound Card

You need one of these to add sound capability to your PC.



Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44KHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis

should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug and play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration.

Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

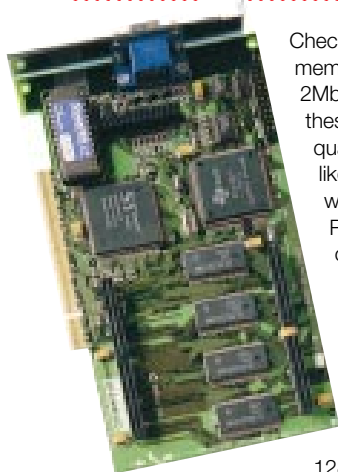
PCW Recommended products

AWE 64 Gold: £199; Creative Labs 01734 344322 (PCW June 97)

Maestro 32/96: £139; Terra Tec 01635 294394 (PCW June 1997)

Buying a Graphics Card

The graphics card sits inside the PC and controls the features which the software displays on the monitor.



Check the amount of memory on the card. 2Mb is standard these days. Better-quality cards are likely to be fitted with VRAM (Video RAM). Also, check out the performance capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit: a large

number of bits means faster performance.

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution that the card supports in Windows. This is measured by the number of pixels the card displays on-screen. The absolute minimum these days is 1,024 x 768 with a refresh rate of 70Hz.

A 2Mb card can display 16-bit colour (65,000 colours) at 1,024 x 768 pixels. A 1Mb card can manage only 8-bit colour (256 colours) at 1,024 x 768 pixels. To display 24-bit colour (16 million colours) at 1,024 x 768 you'll need 4Mb of memory. The refresh rate (measured in Hz) is important, too. It represents the number of frames displayed on-screen per second. A flickering display is very tiring to use.

Find out if your video card is "local bus". Local bus (PCI or VL) is an interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU, which makes it a lot faster than the standard ISA interface.

PCW Recommended products

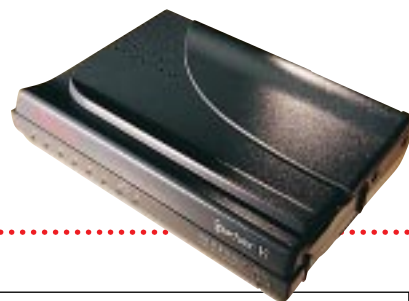
ATI Xpert@ play: £163 (4Mb); ATI 01628 533115

Hercules Stingray 128/3D: £210 (6Mb); Hercules 01635 294300

Orchid Righteous 3D: £132; Orchid 01256 479898 (PCW January 1998)

Buying a Fax Modem

You'll need a modem to connect to the internet or an online service, such as CompuServe or AOL, and also to send and receive email.



Modems are available in three formats: either as PC Cards to plug into notebooks, or as external boxes, or as expansion cards. PC Card modems are the most expensive, while external modems cost slightly more than expansion cards.

Apart from the casing and the external power supply, there is often very little difference between the internal and external

versions of a modem. Most now have a built-in fax capability, which means you can receive faxes on your personal computer to view or print out.

Go for a V.34 28.8Kb/sec modem or one of the new V.34+ 33.6Kb/sec modems. Or, look out for the new 56K versions: these use one of two rival technologies but as yet are unsupported by Information Service Providers.

PCW Recommended products

Fax modems

• Internal

Pace 56 Voice: £169; PMC 0990 561001 (PCW November 97)

Buying Software

Only a few years ago there were dozens of different software applications in each category. During the past two years or so, however, there has been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and not worth considering. We've distilled each category down to just one or two recommended products.

A

■ **ACCOUNTS SOFTWARE** One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.

Recommended products: MYOB, Intuit QuickBooks.

B

■ **BROWSERS** are programs which are used to navigate the internet. A modern browser lets you navigate web pages, download files and send and receive email.

Recommended products: There are only two worth talking about: Netscape Navigator and Microsoft Internet Explorer.

C

■ **CAD SOFTWARE** Computer Aided Design covers everything from architectural drawings, through office planning, to complex engineering drawings.

Recommended products: AutoCAD is the industry standard but we think MicroStation 95 is a more capable product at the high end of the market. At the cheap end, DesignCAD 3D offers astonishing value for money.

■ **CONTACT MANAGERS** (See PIMs)

D

■ **DATABASE** At its simplest, an electronic card index. For just a few hundred names and addresses an electronic-type Filofax, such as Lotus Organizer, may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most offices you are likely to use a database

application that somebody else has written for you.

Recommended products: Lotus Approach, Microsoft Access.

■ **DESKTOP PUBLISHING SOFTWARE (DTP)** This is software used to create newsletters, magazines, books, brochures or advertisements.

Typically, it enables you to incorporate graphics, lay out text in multiple columns and run text around graphics. You also have control over how text appears, in varying degrees of sophistication.

Recommended products: The high-end market leader is Quark XPress on the Mac. On the PC, PageMaker is strong. For serious work on a budget we recommend Serif Publishing Suite, and for sheer ease of use, Microsoft Publisher.

■ **DRAWING SOFTWARE** Programs for drawing, which work using vectors. This means each shape drawn is described using mathematical equations.

Recommended products: At the budget end of the market, MicroGraphx Windows Draw 5 stands out. At the professional end, Corel Draw 7 gets our vote.

■ **IMAGE EDITING SOFTWARE** A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.

Recommended products: For simple image editing the popular shareware program, PaintShop Pro, is fine. For professionals, Adobe's Photoshop is the industry standard.

■ **INTEGRATED PACKAGES** Typically, these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another but

integrated packages tend to lack some of the advanced features of individual applications.

Recommended product: Microsoft Works.

J

■ **JAVA.** A language based on C++, but easier to learn and use. Java runs on a "virtual machine" interpreter, so programs can run on many different platforms.

Recommended products: Borland JBuilder

M

■ **MULTIMEDIA AUTHORING TOOLS** Programs designed for producing interactive multimedia applications; typically for training applications or for CD-ROMs. The software lets you control and manipulate different types of media such as sound files, audio files, video clips and graphic files.

Recommended product: Macromedia Director, the product used to produce PCW's cover-mounted CD-ROM, gets our vote.

O

■ **OCR SOFTWARE** Optical Character Recognition software converts printed text into computer text you can edit. You will need a scanner or fax card to get the printed text onto your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.

Recommended products: OmniPage is the best product we have found, but TextBridge offers most of the same capabilities for less cash.

P

■ **PERSONAL INFORMATION MANAGERS (PIMs)** PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.

Recommended products:

SideKick 95 and Organizer are excellent PIMs. For contact managers we would recommend Goldmine for Windows.

■ **PRESENTATION GRAPHICS** Increasingly, the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides and support for video clips.

Recommended products: Powerpoint and Freelance 97 are both capable products sold with Microsoft Office and SmartSuite respectively.

■ **PROGRAMMING TOOLS** Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which, although much easier to use, generally sacrifice performance and flexibility in the process. Commercial programs like Word for Windows are written using low-level languages.

Bespoke applications and prototypes are often written using Delphi or Visual Basic.

Recommended products: Delphi 3.0 is a great example of scalability, catering for beginners and serious developers working on major projects. Optima Power++ is the pick of the high-end Windows development tools.

■ **PERSONAL FINANCE PACKAGES** These help manage home finances. They are also well suited to some small businesses and tend to be easier to use than full-blown accounts packages.

Recommended product: Quicken is the outstanding product in this category and has no serious rivals.

■ **PROJECT MANAGEMENT** Programs for managing large projects — anything from building a power station to planning a



marketing campaign.

Recommended product:

SuperProject 4.0 for Windows.

R

■ **REMOTE CONTROL S/W** Lets you access and control a PC remotely, usually via a modem.

Recommended product:

ReachOut, for its simple interface and support for different networks, particularly TCP/IP.

S

■ **SPREADSHEET** This is an electronic version of what would be an old-fashioned ledger.

Excellent graphing and charting facilities are included.

Recommended products:

Lotus 1-2-3, Microsoft Excel.

■ **SUITES** Most general business software is now sold in suites.

Two suites are widely available: Lotus SmartSuite and Microsoft Office. Lotus SmartSuite also contains a database. With Microsoft Office, you pay extra for Office Professional which contains Microsoft's Access database.

Recommended product:

Microsoft Office is close to the

industry standard. Its high level of integration gives it the edge over the opposition.

V

■ **VISUAL PROGRAMMING** (see Programming Tools)

W

■ **WEB EDITORS** Programs designed to do for web page design what DTP did for magazines and newsletters. They let you create web pages without writing HTML. You can incorporate graphics, backgrounds, tables, images and sounds.

Recommended products:

HotMetal Pro 3.0 is our first choice, while Adobe Pagemill is a capable alternative.

■ **WORD PROCESSOR** An application in which you can write letters and prepare reports, or produce a simple newsletter. The latest word processors have advanced features such as outliners, table editors and facilities for adding columns of figures.

Recommended products:

Microsoft Word is the clear market leader but WordPro is a capable alternative.

A-Z of Recommended Software Products

■ *If you would like to read any of the reviews of software listed here and do not have the original issues, you can order Personal Computer World on CD-ROM. It costs just £9.95 (including postage and packing). See pages 312/313 for full details.*

	Category	Product	Supplier	Contact	Price (ex VAT)	Date of PCW review
A	Accounts	MYOB	Bestware	01752 201901	£195	April 1997
	Accounts	QuickBooks	Intuit	01932 578501	£125	April 1997
B	Browsers	Netscape Navigator	Netscape	0181 564 5100	£49	Mar 1997
	Browsers	Internet Explorer	Microsoft	0345 002000	Free	Jun 1996
C	CAD	Microstation	Bentley	01344 412233	£3,495	Jan 1997
	CAD	DesignCAD 3D	BVG	01874 611633	£149.95	Jan 1997
D	Database	Approach 97	Lotus	01784 455445	£40	Oct 1997
	Database	Access 97	Microsoft	0345 002000	£235	Oct 1997
	Desktop publishing	XPress 3.3	Quark	01483 454397	£795	May 1997
	Desktop publishing	Publisher	Microsoft	01734 270000	£70	May 1997
	Desktop publishing	Publishing Suite 3.07	Serif	0115 9421502	£99	May 1997
	Drawing	CorelDraw 7	Corel	0800 973189	£495	Sept 1997
	Drawing	Windows Draw 5	MicroGraphx	0345 089372	£38.30	Sept 1997
I	Image editing	Photoshop	Adobe	0181 606 4000	£382	Dec 1996
	Image editing	PaintShop Pro	Digital Workshop	01295 258335	£49.95	Jun 1995
	Integrated package	Works/Win 95	Microsoft	0345 002000	£93.61	Apr 1997
J	Java programming	JBuilder	PowerSoft	01628 597100	£399	N/A
M	Multimedia authoring	Director 5.0	Macromedia	0181 200 8282	£99	Oct 1996
O	OCR	PaperPort Plus	Visioneer	0800 973245	£58.72	Dec 1997
	OCR	Presto! OCR Pro 3.0	Guildsoft	01752 895100	£58.72	Dec 1997
P	Personal finance	Quicken	Intuit	0800 585058	£34	May 1996
	PIM/contact manager	Organizer 2.1	Lotus	01784 455445	£99	Jun 1997
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395	Jun 1997
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39	Jun 1997
	Presentation graphics	Freelance	Lotus	01784 445808	£42	Mar 1998
	Presentation graphics	Powerpoint	Microsoft	0345 002000	£277	Mar 1998
	Programming tools	Power ++ 2.0	PowerSoft	01628 597100	£345	Sept 1997
Programming tools	Delphi 3.0	Borland	01734 320022	£89	Apr 1997	
Project management	SuperProject 4.0	Computer Associates	01753 679679	£495	May 1996	
R	Remote control/Access	PC Anywhere	Symantec	01628 592320	£139	Nov 1997
S	Spreadsheet	Excel	Microsoft	0345 002000	£220	May 1995
	Spreadsheet	1-2-3	Lotus	01784 455445	£365	May 1997
	Suite	Office (Standard)	Microsoft	0345 002000	£360	Jul 1997
	Suite	Office (Professional)	Microsoft	0345 002000	£460	Jul 1997
	Web authoring	HotMetal Pro 4.0	SoftQuad	0181 387 4110	£69	Jan 1998
W	Web authoring	FrontPage 98	Microsoft	0345 002000	£99	Jan 1998
	Word processing	Word	Microsoft	0345 002000	£220	Oct 1996

ChipChat



■ Last month we said that the Olympus C-1400L digital camera costs £1,299.99 (ex VAT). Actually, the price includes VAT. Sorry.

Ninety-nine red Walloons

ChipChat has received an anonymous tip-off as to the identity of the pie thrower who splatted Bill Gates as he was arriving in Brussels for talks with the Belgian prime minister. A man claiming to be the Phantom Flan Flinger, of Tiswas fame, rang to gloat about the custard attack. "I got him right in the mush," chortled the Phantom. "It was beautiful."

Meanwhile, back at the ranch...

There are reports of crossed wires in Bill Gates' new \$40m palace. "I brought up a big screen in my bedroom to watch a programme and for some reason the system stopped working," he confessed to TV talk-show host Barbara Walters. "It was sitting there shining and I wanted to go to sleep. So finally I had to get a blanket and put it over the screen."

(The Independent, 5th Feb 1998).

Caption competition



Left "For instance, pressing the Extract key gets the robot dentist going... Whoops! I can never find the Cancel key on this thing."

■ Think you can do better than this? Enter via our web site at www.pcw.co.uk or write to the usual address (p10) with your caption(s) on a postcard marked "April Caption Compo" before 15th March. We'll print the funniest entry in all its glory and the winner will receive a £20 book token.

Congratulations to Jonathan Crothers, winner of February's competition:

Kirk: "Hmmm... hmmm... come on... come on, what's taking so long?"

Klingon: "Ha! I said you wouldn't get through to Microsoft help at this time of day!"

Bones: "He's right, Jim. It's no use — I can't get through either!"



...riches beyond the dreams of avarice?

While researching next month's 20th anniversary issue, our glamorous news reporter, Susan Pederson, was thrilled to find herself talking to Sir Clive Sinclair, inventor of the ZX Spectrum. When asked about today's "new look" PCW, Sir Clive replied: "I couldn't believe how fat it's got. You must all be making a lot of money."

Well, someone is, Sir Clive, and you can rest assured that ChipChat is undertaking a full investigation into the missing millions. Oh, and we've added Sir Clive's name to that list of suspects.

You'll only feel a little prick

One of the oddest press releases we received this month was from software

house, SPSS. Apparently, Merton and Sutton Community Trust has been using its software to analyse the results of a vasectomy survey. Not the kind of thing with which ChipChat would like to be associated, it being a tender subject for many men. Apparently, SPSS believes the software is a cut above the rest and a snip at twice the price.

The milk of human kindness

The government has issued a warning not to buy frozen sperm over the internet, which is not subject to the rigorous controls demanded in the UK. ChipChat is not a big fan of e-commerce. The only thing we ever bought over the internet was a milkshake and even that tasted off.